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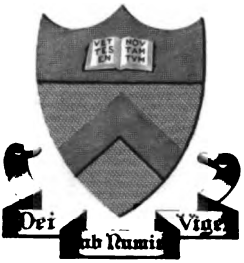

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REPORT

OF THE

COMMISSIONER OF NAVIGATION

TO THE

SECRETARY OF THE TREASURY.

1886.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1886.

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REPORT

OF THE

COMMISSIONER OF NAVIGATION.

TREASURY DEPARTMENT,
BUREAU OF NAVIGATION,
Washington, D. C., November 13, 1886.

SIR: I have the honor to submit, as required to do annually by the act of July 5, 1884, the following report upon the condition of the mercantile marine and merchant seamen of the country, together with a statement of the operations of the Bureau of Navigation during the last fiscal year. I also add such comments as are suggested, by the action of the laws relative to shipping and seamen, with such recommendation to modify and amend them as in my judgment seem to be required.

The amount of routine work of the Bureau which, as stated in my last annual report, may be classed under three distinct heads, continues to increase as the advantages and services of the office become generally known to ship-owners and seamen.

First. In the branch of marine documents and assignment of official numbers and signal letters to vessels, thirteen hundred and fifty certificates of registry of vessels engaged in foreign trade have been issued, twenty-seven of which were for new vessels, and thirteen hundred and twenty-three for vessels whose papers were changed. Fifty-four hundred and eighty-five enrollments have also been granted during the fiscal year.

The annual list of merchant vessels, recently published by the Bureau, has been further improved and made more useful to seamen. This is the third annual edition of the work prepared by the Bureau of Navigation, and the eighteenth issue since its commencement by the Bureau of Statistics in the year 1868. The published list exhibits a total of 25,414 vessels, of which 16,737 are sailing vessels and 5,931 steam vessels.

The names of 62 vessels have been changed during the last fiscal year under the act of March 3, 1881.

Second. In the division of general superintendence of the commercial marine and merchant seamen of the country a multitude of questions more or less technical and difficult have been received by the office for settlement, and in the application of the laws thereto the public interests have been guarded as well as those of the parties concerned. Under the head of *Seamen* the condition and requirements of that indispensable class is more extensively discussed.

The administration of the laws governing the assessment of the tonnage tax and movements of shipping generally belong to this branch.

Third. Under the general management of the United States shipping offices and of matters connected with the shipment and discharge of seamen, a large amount of routine work has been performed and many questions adjusted in the administration of the laws relating to wages, advances, and allotments.

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The consolidation of the various branches relating to shipping and seamen which was accomplished by the act of July 5, 1884, has now been in operation more than two years, and is found to work well, and to admit great saving in the clerical force formerly required when the labor was divided among numerous officers.

THE UNITED STATES SHIPPING OFFICES.

The Government shipping offices for the merchant marine were established by the act of April 7, 1872, which likewise embodied the principal provisions that now govern and control the officers and seamen of the mercantile service.

Offices for the shipment of crews of vessels were, under the act referred to, located at all the principal ports of the country, and shipping commissioners, appointed by the different judges of the circuit courts as provided in the act, were placed in charge of them. The shipping offices were conducted as provided by the law, and rules for their guidance laid down by the courts, until the adoption of the act of June 26, 1884, section 27 of which provided for a change in the mode of appointing and compensating the shipping commissioners.

The administration of the law concerning the shipping offices, and all matters connected with merchant seamen, was transferred to the Bureau of Navigation, and these offices were in accordance with its provisions reorganized throughout the country upon a uniform system. They have been divided into three classes, according to the amount of business done, and the compensation has been fixed proportionately. Monthly accounts are rendered by them and adjusted in the mode and manner provided for expenditures in the collection of customs.

There were some points in the shipping act of 1872 that seemed to require modification in order to enlarge the field of the operations of shipping commissioners.

The act referred to provided that the master of every ship bound from a port in the United States to any foreign port, or any ship of the burden of 75 tons and upwards, bound from a port on the Atlantic to a port on the Pacific, or *vice versa*, shall, before he proceeds on such a voyage, make an agreement in writing or in print with every seaman whom he carries to sea as one of his crew, every such agreement to be "signed by each seaman in the presence of a shipping commissioner."

Two supplementary acts, amending the act of 1872, were approved January 10, 1873, and June 9, 1874, which provide that this section "shall not apply to masters of vessels engaged in trade between the United States and the British North American possessions, or the West Indies, or the Republic of Mexico." In view of this wording of the law it has been held that shipping commissioners have no authority to engage crews for vessels bound to ports in the countries and islands enumerated; but in practice many shipmasters found it to their advantage to employ a shipping commissioner for the shipment of seamen in such cases, and it was also often found to be in the interest of vessels bound coastwise to do so. The latter act was consequently amended by section 2 of the shipping law approved June 19, 1886, which reads as follows:

SEC. 2. That shipping commissioners may ship and discharge crews for any vessel engaged in the coastwise trade, or the trade between the United States and the Dominion of Canada, or Newfoundland, or the West Indies, or the Republic of Mexico, at the request of the master or owner of such vessel, the shipping and discharging fees in such cases to be one-half that prescribed by section forty-six hundred and twelve of the Revised Statutes, for the purpose of determining the compensation of shipping commissioners.

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The above provision came into operation as law July 1, 1886, and it is believed that the usefulness of the shipping offices and the scope of their work will be considerably improved in consequence.

The reports of the different shipping commissioners, giving detailed statements of the work performed in the shipping offices of the country, including replies to certain questions relative to the effect of recent laws upon seamen and their present condition in our merchant marine, may be found in the appendix.

I annex hereto tables giving a synopsis of shipments and discharges of seamen at the principal seaports of the country and one showing the average rate of wages paid during each month of the year:

Vessels' crews shipped at the different ports for the year ending June 30, 1886.

Ports.	Vessels bound, foreign.	Officers shipped, foreign.	Seamen shipped, foreign.	Vessels bound, coastwise.	Officers shipped, coastwise.	Seamen shipped, coastwise.	Total number of vessels.	Total officers shipped.	Total seamen and firemen shipped.
New York	531	1,620	8,451	464	52	824	995	1,672	9,275
San Francisco	336			10			346	1,112	7,500
Philadelphia	60	212	648	631	78	2,108	691	385	2,756
Baltimore	94	166	712				94	166	712
Boston	154	243	1,195	154	140	1,221	745	383	2,424
New Orleans	40		841				40	101	408
Portland, Me									
Bath, Me	1		1	112		176	113		266
Providence, R. I	3	3	11	346	93	967	349	96	1,074
New Bedford	13	20	150	5	2	21	18	22	171
Norfolk, Va	87	13	67	322	17	808	409	30	875
Charleston	7		27	21		27	28		54
Savannah	5		37				5		37
Waldoborough, Me									
Brunswick, Ga	11	18	54	2	1	4	13	19	58
Mobile, Ala	8	5	21	13	10	53	16	15	74
Pascagoula	5		34				5		34
Astoria, Oreg									
Rockland, Me				465	183	715	465	183	715
Port Townsend, Wash	82	153	798				82	153	798
Pensacola	18	26	120	3	5	18	21	31	138
	1,450	2,479	13,162	2,548	576	6,942	4,435	4,368	27,364

Number of officers and men discharged at the principal United States shipping offices for the year ending June 30, 1886.

Ports.	Coastwise.				Foreign.				Grand total.
	Officers.	Men.	Firemen.	Total.	Officers.	Men.	Firemen.	Total.	
New York	2	4		6	1,695	7,456	1,342	10,494	10,499
San Francisco						8,222		8,222	8,222
Philadelphia	29	293		322	438	846	177	1,461	1,783
Baltimore						619		619	619
Boston		362		362		1,614		1,614	1,976
New Orleans						545		545	545
Bath		24		24		16		16	40
Providence, R. I		105		105		13		13	118
Norfolk		6		6		19		19	25
Charleston, S. C		16		16		7		7	23
Savannah									
Waldoborough, Me									
Brunswick, Ga	2	11		13	15	37		52	65
Mobile	3	23		26	37	100		137	163
Pascagoula					14	69		83	83
New Bedford		18		18		233		233	251
Pensacola						1		1	1
Port Townsend						573		573	573
	36	862		898	2,199	20,380	1,519	24,089	24,985

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Average of seamen's monthly wages paid at the principal ports.

Ports.	July.	August.	September.	October.	November.	December.	January.	February.	March.	April.	May.	June.	Total.
New York:													
Coastwise	$19 18	$18 09	$16 48	$16 48	$18 00	$19 12	$13 24	$16 38	$16 63	$19 51	$21 73	$16 80	$17 66⅔
Foreign	15 13	15 95	15 38	14 40	14 12	14 68	14 07	15 12	14 43	11 47	14 94	16 79	14 70⅔
San Francisco:													
Coastwise	34 90	35 71	33 23	32 50	30 78	29 42	32 85	28 31	32 16	34 12	34 50	33 33	32 65 1/3
Foreign	26 18	28 25	26 37	24 12	22 05	19 10	23 15	27 58	28 80	28 78	28 80	28 47	25 96⅔
Philadelphia:													
Coastwise	20 00	20 00	20 00	20 00	20 00	18 00	15 00	15 00	20 00	20 00	20 00	20 00	19 00
Foreign	18 00	18 00	18 00	18 00	18 00	15 00	15 00	15 00	18 00	18 00	18 00	18 00	17 25
Boston:													
Coastwise													
Foreign	18 00	20 00	16 00	15 00	15 00	15 00	15 00	15 00	18 00	18 00	18 00	18 00	16 75
Baltimore:													
Coastwise	17 00	17 00	17 00	17 00	17 00	17 00	17 00	17 00	17 00	17 00	17 00	17 00	17 00
Foreign	17 00	17 00	17 00	17 00	17 00	17 00	17 00	17 00	17 00	17 00	17 00	17 00	17 00
New Orleans:													
Coastwise	20 00	20 00	20 00	20 00	20 00	20 00	15 00	15 00	15 00	20 00	20 00	20 00	18 75
Foreign	18 00	18 00	18 00	18 00	18 00	18 00	18 00	18 00	18 00	16 00	15 00	15 00	18 75
Portland, Me.:													
Coastwise	20 00	20 00	20 00	20 00	20 00	20 00	20 00	20 00	20 00	20 00	20 00	20 00	20 00
Foreign													
Bath, Me.:													
Coastwise	22 00	22 00	22 00	20 00	20 00	20 00	18 00	18 00	18 00	22 00	22 00	22 00	20 50
Foreign													
Providence, R.I.:													
Coastwise	20 00	20 00	20 00	20 00	20 00	18 00	18 00	18 00	20 00	22 00	20 00	20 00	19 66⅔
Foreign							16 00	16 00				20 00	17 30
New Bedford:													
Coastwise	20 00	20 00	20 00	20 00	20 00	20 00	20 00	20 00	20 00	20 00	20 00	20 00	20 00
Foreign	18 00	18 00	18 00	18 00	18 00	18 00	18 00	18 00	18 00	18 00	18 00	18 00	18 00
Norfolk:													
Coastwise	19 00	19 00	19 00	19 00	19 00	20 00	20 00	20 00	20 00	19 00	19 00	19 00	19 33⅓
Foreign	20 00	20 00	20 00	20 00	20 00	20 00	20 00	20 00	20 00	20 00	20 00	20 00	20 00
Charleston:													
Coastwise	20 00	20 00	20 00	20 00	20 00	20 00	20 00	20 00	20 00	20 00	20 00	20 00	20 00
Foreign													
Savannah:													
Coastwise													
Foreign	20 00				16 00							18 00	18 00
Brunswick:													
Coastwise	20 00	20 00	20 00	20 00	25 00	25 00	25 00	20 00	20 00	20 00	20 00	20 00	21 25
Foreign	20 00	20 00	20 00	20 00	18 00	25 00	18 00	18 00	18 00	18 00	18 00	18 00	19 25
Port Townsend:													
Coastwise													
Foreign	23 00	23 33	21 28	21 25	23 33	20 00	20 00	25 00	27 00	30 00	28 00	28 00	24 08⅓
Pensacola:													
Coastwise								18 00	15 00			10 00	14 33⅓
Foreign	16 00	15 00	18 00		17 00	18 00		17 00	20 00	18 00	15 00	17 00	14 25
Rockland:													
Coastwise	20 00	20 00	20 00	20 00	20 00	20 00	20 00	20 00	20 00	20 00	20 00	20 00	20 00
Foreign	20 00	20 00	20 00	20 00	20 00	20 00	20 00	20 00	20 00	20 00	20 00	20 00	20 00
Pascagoula:													
Coastwise													
Foreign	22 50	22 50	22 50	22 50	22 50	22 50	22 50	22 50	22 50	22 50	22 50	22 50	22 50
Mobile:													
Coastwise	18 00	18 00	18 00		20 00				20 00	20 00	20 00		19 14⅔
Foreign		18 00		18 00					20 00				18 66⅔

THE TONNAGE TAX.

Since July 1, 1884, when the shipping act of that year went into effect, the tax on tonnage has been levied according to the provisions of section 14 of that law, which reads as follows:

SEC. 14. That in lieu of the tax on tonnage of thirty cents per ton per annum heretofore imposed by law, a duty of three cents per ton, not to exceed in the aggregate fifteen cents per ton in any one year, is hereby imposed at each entry on all vessels which shall be entered in any port of the United States from any foreign port or place in North America, Central America, the West India Islands, the Bahama Islands, the Bermuda Islands or the Sandwich Islands, or Newfoundland; and a duty of six cents per ton, not to exceed thirty cents per ton per annum, is hereby imposed at each entry upon all vessels which shall be entered in the United States from any

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other foreign ports: *Provided*, That the President of the United States shall suspend the collection of so much of the duty herein imposed, on vessels entered from any port in the Dominion of Canada, Newfoundland, the Bahama Islands, the Bermuda Islands, the West India Islands, Mexico, and Central America down to and including Aspinwall and Panama, as may be in excess of the tonnage and light-house dues, or other equivalent tax or taxes, imposed on American vessels by the Government of the foreign country in which such port is situated, and shall upon the passage of this act, and from time to time thereafter, as often as it may become necessary by reason of changes in the laws of the foreign countries above mentioned, indicate by proclamation the ports to which such suspension shall apply, and the rate or rates of tonnage duty if any, to be collected under such suspension. *And provided further*, That all vessels which shall have paid the tonnage tax imposed by section forty-two hundred and nineteen of the Revised Statutes for the current year, shall not be liable to the tax herein levied until the expiration of the certificate of last payment of the said tax. And sections forty-two hundred and twenty-three and forty-two hundred and twenty-four and so much of section forty-two hundred and nineteen of the Revised Statutes as conflicts with this section, are hereby repealed.

In view of the somewhat ambiguous terms of the foregoing, and of several doubtful points connected with it, mentioned in my last year's report, it was thought best to give a more positive sense to the law and at the same time to extend the limit of the proviso concerning the President's proclamation to import and export duties on cargo, and to all other fees, dues, or duties. Section 14 of the act of June 26, 1884, was amended accordingly by the act of June 19, 1886, which is as follows:

SEC. 11. That section fourteen of "An act to remove certain burdens on the American merchant marine and encourage the American foreign carrying trade, and for other purposes," approved June twenty-sixth, eighteen hundred and eighty-four, be amended so as to read as follows:

"SEC. 14. That in lieu of the tax on tonnage of thirty cents per ton per annum imposed prior to July first, eighteen hundred and eighty-four, a duty of three cents per ton, not to exceed in the aggregate fifteen cents per ton in any one year, is hereby imposed at each entry on all vessels which shall be entered in any port of the United States from any foreign port or place in North America, Central America, the West India Islands, the Bahama Islands, the Bermuda Islands, or the coast of South America bordering on the Caribbean Sea, or the Sandwich Islands, or Newfoundland; and a duty of six cents per ton, not to exceed thirty cents per ton per annum, is hereby imposed at each entry upon all vessels which shall be entered in the United States from any other foreign ports, not, however, to include vessels in distress or not engaged in trade: *Provided*, That the President of the United States shall suspend the collection of so much of the duty herein imposed, on vessels entered from any foreign port, as may be in excess of the tonnage and light house dues, or other equivalent tax or taxes, imposed in said port on American vessels by the Government of the foreign country in which such port is situated, and shall, upon the passage of this act, and from time to time thereafter as often as it may become necessary by reason of changes in the laws of the foreign countries above mentioned, indicate by proclamation the ports to which such suspension shall apply, and the rate or rates of tonnage duty, if any, to be collected under such suspension: *Provided, further*, That such proclamation shall exclude from the benefits of the suspension herein authorized the vessels of any foreign country in whose ports the fees or dues of any kind or nature imposed on vessels of the United States, or the import or export duties on their cargoes, are in excess of the fees, dues, or duties imposed on the vessels of the country in which such port is situated, or on the cargoes of such vessels; and sections forty-two hundred and twenty-three and forty-two hundred and twenty-four, and so much of section forty-two hundred and nineteen of the Revised Statutes as conflicts with this section, are hereby repealed."

Under the above law, vessels from ports in the following States and countries are subject to a tax of 3 cents per ton for each entry, not exceeding 15 cents in any one calendar year:

Countries bordering upon the waters of the Atlantic.—Ports in the Provinces of New Brunswick, Nova Scotia, Cape Breton and Newfoundland, Prince Edward Island, &c., Provinces of Quebec and Ontario, Labrador, Greenland, Mexico, Belize, Guatemala, Honduras, Nicaragua, Costa Rica, United States of Colombia, Venezuela, the islands of the West Indies, Bermudas, Bahamas.

Countries and states bordering on the Pacific.—Mexico, Guatemala, Honduras, Nicaragua, Costa Rica, Panama, British Columbia, Sandwich Islands.

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Vessels from all other parts of the world pay 6 cents per ton at each entry, not exceeding 30 cents per annum.

The total tonnage tax collected during the fiscal year amounted to $508,731.77, which is an increase of $117,856.62 compared with the amount collected during the year ending June 30, 1885.

This increase of about one-third in the tonnage on which dues were paid over the amount collected for the preceeding year indicates an increase in the commerce between the United States and foreign countries, which may undoubtedly be partly attributable to the recent legislation of Congress favoring the shipping interests.

The increase over last year in the amount of the tax collected from sailing vessels is about 25 per cent., and the increase in the amount of tax collected from steam vessels is about 35 per centum.

The number of entries on which vessels paid tax in the fiscal year of 1885 was 12,078. The number of entries on which vessels paid tax in the fiscal year of 1886 was 14,149.

Collections of tonnage tax and nationality of vessels paying the same during the fiscal years ending June 30, 1884, 1885, and 1886, respectively.*

[The deposits on account of tonnage were $506,284.50, not representing the entire collections for the year.]

Nationality.	Sailing vessels.		Steam vessels.		Total.	
	No.	Tonnage duty.	No.	Tonnage duty.	No.	Tonnage duty.
At 3 cents per ton.						
United States	3,087	$26,328 74	388	$8,338 28	3,475	$34,667 02
Great Britain	3,106	14,470 86	413	8,956 71	3,519	23,427 57
Norway	214	3,168 41	35	535 98	249	3,704 39
Germany	23	300 45	6	162 66	29	463 11
Italy	25	322 08	8	122 22	33	444 30
Austria	24	476 31	.....	.....	24	476 31
Sweden	27	348 75	1	11 67	28	360 42
Spain	87	1,023 57	121	5,178 45	208	6,202 02
France	10	86 49	.....	.....	10	86 49
Holland	8	58 80	.....	.....	8	58 80
Denmark	8	100 38	1	32 82	9	133 20
Russia	11	169 14	.....	.....	11	169 14
Mexico	14	59 76	13	548 25	27	608 01
Hawaiia	6	114 84	5	217 77	11	332 61
Honduras	2	10 80	.....	.....	2	10 80
Hayti	3	14 19	.....	.....	3	14 19
Costa Rica	1	5 37	.....	.....	1	5 37
Argentine Republic	2	25 05	.....	.....	2	25 05
San Salvador	2	4 20	.....	.....	2	4 20
Bolivia	2	84 78	.....	.....	2	84 78
Total	6,662	47,172 97	991	24,104 81	7,653	71,277 78
At 6 cents per ton.						
United States	675	$33,143 52	62	$6,747 54	737	$39,891 06
Great Britain	1,353	79,603 32	1,752	176,621 34	3,105	256,224 66
Norway	777	29,134 26	4	141 06	781	29,275 32
Germany	477	24,087 52	186	21,743 22	663	45,830 74
Italy	529	18,623 66	26	2,390 10	555	21,013 76
Austria	117	4,646 31	.....	.....	117	4,646 31
Sweden	100	3,352 50	1	73 08	101	3,425 58
Spain	6	176 76	9	773 94	15	950 70
France	22	1,609 56	68	9,553 02	90	11,162 58
Holland	28	1,486 20	32	3,653 52	60	5,139 72
Denmark	30	635 34	17	1,991 82	47	2,627 16
Russia	87	3,330 48	1	17 70	88	3,348 18
Belgium	3	174 60	77	10,798 62	80	10,973 22
Portugal	42	985 26	3	168 84	45	1,154 10
Brazil	3	39 30	.....	.....	3	39 30
Argentine Republic	2	78 48	.....	.....	2	78 48
Chili	7	323 82	.....	.....	7	323 82
Total	4,258	201,430 89	2,238	284,673 80	6,496	486,104 69

Alien.—Sailing vessels, 25; tonnage duty, $281.19. Steam vessels, 2; tonnage duty, $1.068.11. Total vessels, 27; total tonnage duty, $1,349.30.

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Collections of tonnage tax and nationality of vessels, &c.—Continued.

Nationality.	Sailing vessels.		Steam vessels.		Total.	
	No.	Tonnage duty.	No.	Tonnage duty.	No.	Tonnage duty.
Total collections for 1886.						
United States	3,762	$59,472 26	450	$15,085 82	4,212	$74,558 08
Great Britain	4,459	94,074 18	2,165	185,578 05	6,624	279,652 23
Norway	991	32,302 67	39	677 04	1,030	32,979 71
Germany	500	24,387 97	192	21,905 88	692	46,293 85
Italy	554	18,945 74	34	2,512 32	588	21,458 06
Austria	141	5,122 62	.....	.....	141	5,122 62
Sweden	127	3,701 25	2	84 75	129	3,786 00
Spain	93	1,200 33	130	5,952 39	223	7,152 72
France	32	1,696 05	68	9,553 02	100	11,249 07
Holland	36	1,545 00	32	3,653 52	68	5,198 52
Denmark	38	735 72	18	2,024 64	56	2,760 36
Russia	98	3,499 62	1	17 70	99	3,517 32
Belgium	3	174 60	77	10,798 62	80	10,973 22
Mexico	14	59 76	13	548 25	27	608 01
Hawaiia	6	114 84	5	217 77	11	332 61
Portugal	42	985 26	3	168 84	45	1,154 10
Honduras	2	10 80	.....	.....	2	10 80
Hayti	3	14 19	.....	.....	3	14 19
Costa Rica	1	5 37	.....	.....	1	5 37
Brazil	3	39 30	.....	.....	3	39 30
Argentine Republic	4	103 53	.....	.....	4	103 53
Chili	7	323 82	.....	.....	7	323 82
San Salvador	2	4 20	.....	.....	2	4 20
Bolivia	2	84 78	.....	.....	2	84 78
Total	10,920	248,603 86	3,229	258,778 61	14,149	507,382 47

Collections of tonnage tax and nationality of vessels, &c.—Continued.

[The deposits on account of tonnage were $506,284.50, not representing the entire collections for the year.]

Nationality.	1885.						1884.	
	Sailing vessels.		Steamers.		Total.		Total.	
	No.	Tonnage duty.	No.	Tonnage duty.	No.	Tonnage duty.	No.	Tonnage duty.
Total collections for 1885 *and* 1884.								
United States	3,107	$46,305 61	555	$13,019 68	3,662	$59,325 29	2,177	$272,118 50
Great Britain	3,851	82,833 75	1,927	133,097 36	5,778	215,931 11	3,091	626,140 60
Norway	791	24,766 64	18	536 73	809	25,303 37	626	99,902 70
Germany	409	17,826 36	166	18,651 66	575	36,478 02	361	97,110 60
Italy	429	14,274 21	10	946 11	439	15,220 32	358	92,074 20
Austria	102	3,911 46	.....	.....	102	3,911 46	111	22,485 30
Sweden	142	3,976 76	1	73 08	143	4,049 84	110	16,688 70
Spain	66	955 11	82	3,481 74	148	4,436 85	122	24,441 00
France	26	612 72	61	8,027 10	87	8,639 82	75	23,925 80
Holland	25	665 70	22	2,653 41	47	3,319 11	28	8,336 10
Denmark	41	704 88	19	1,433 58	60	2,138 46	42	6,982 50
Russia	63	2,040 15	1	17 70	64	2,057 85	74	13,526 40
Belgium	1	67 38	56	7,831 14	57	7,898 52	25	13,278 60
Mexico	12	52 80	12	531 75	24	584 55	22	2,059 70
Hawaiia	9	215 19	.....	.....	9	215 19	7	1,038 90
Portugal	41	848 22	1	56 28	42	904 50	26	3,205 80
Honduras	1	9 60	.....	.....	1	9 60	2	185 10
Hayti	5	20 70	.....	.....	5	20 70	4	233 70
Costa Rica	4	21 80	5	44 40	9	65 88	2	145 50
United States of Colombia	2	18 60	.....	.....	2	18 60	3	121 20
Brazil	5	73 50	.....	.....	5	73 50	3	257 10
Venezuela	.....	.....	.....	.....	.....	.....	1	36 60
Argentine Republic	1	39 24	.....	.....	1	39 24	2	475 50
Liberia	.....	.....	.....	.....	.....	.....	1	7 50
Chili	2	137 10	.....	.....	2	137 10	4	821 70
San Salvador	2	4 20	.....	.....	2	4 20	1	21 00
Greece	1	17 52	.....	.....	1	17 52	1	87 60
Ecuador	.....	.....	.....	.....	.....	.....	1	69 60
Dominica	2	3 00	.....	.....	2	3 00	.....	.....
Bolivia	2	71 55	.....	.....	2	71 55	.....	.....
Total	9,142	200,473 43	2,936	190,401 72	12,078	390,875 15	7,280	1,295,772 50

Grand total, 14,176 vessels, $508,731.77.

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Tonnage-tax receipts at all rates during the fiscal year ending June 30, 1884, under the old law, and during the fiscal years 1885 and 1886, under the new law, divided in respect to the different ports where collected.

Ports.	1884.		1885.		1886.	
	No. of vessels.	Amount collected.	No. of vessels.	Amount collected.	No. of vessels.	Amount collected.
Alexandria	5	$744 30	12	$196 47	10	$116 25
Apalachicola	66	10,746 00	48	1,351 16	32	845 16
Astoria	71	19,264 20	101	5,510 85	65	3,632 46
Baltimore	253	64,203 00	418	22,591 14	506	28,214 15
Bangor	5	480 00	5	73 71	17	139 38
Barnstable	4	443 70	9	136 07	15	214 61
Bath	3	397 50	13	115 30	9	63 39
Beaufort, S. C	35	6,757 80	44	1,920 14	46	1,920 48
Belfast	13	483 90	35	175 33	68	154 86
Boston	671	83,999 10	1,342	32,011 61	1,897	40,544 10
Brashear	3	72 90	3	4 11	3	9 90
Bridgeport	2	150 60	2	10 35	8	32 34
Brownsville	5	294 30	4	13 64	4	59 49
Brunswick, Ga	131	20,048 60	161	4,527 03	155	4,014 54
Buffalo	92	3,493 00	125	791 39		
Burlington, Vt	87	2,778 90	106	630 17	135	461 19
Cape Vincent	75	1,836 90	152	506 15	1	72
Castine			4	38 40		
Cedar Keys	3	439 20	1	8 46		
Charleston	114	15,874 50	153	4,650 68	206	6,043 23
Chicago	42	3,882 60	35	325 16		
Cleveland	38	2,574 30	86	671 23	18	221 88
Coos Bay			3	28 25		
Corpus Christi	3	788 40			1	128 10
Detroit	131	4,637 00	307	1,263 62	10	149 40
Duluth	17	939 00	51	367 56	1	11 70
Dunkirk	1	28 20	1	8 01		
Eastport	69	2,094 90	189	1,030 52	190	753 17
Edgartown	8	573 60	24	190 99	43	385 92
Ellsworth	1	3 60	6	34 57	5	14 11
Erie	2	45 90	4	22 63		
Eureka	12	1,411 70	7	112 29	18	361 44
Fall River	1	20 40	6	16 60	7	31 23
Fernandina	7	996 60	15	309 62	19	234 60
Galveston	108	18,782 40	112	3,213 16	171	6,202 74
Georgetown, D. C	7	674 70	3	36 33	12	105 93
Georgetown, S. C	2	119 70	3	21 15	2	11 22
Gloucester	34	2,124 00	87	907 85	87	1,263 69
Grand Haven	4	286 80	17	69 64		
Jacksonville	11	316 20	13	41 61	28	135 79
Key West	32	661 50	83	598 20	97	755 76
Machias	4	81 00	5	13 08	5	20 25
Marblehead	10	302 70	9	27 69	20	64 23
Marquette	97	14,291 10	58	1,016 24		
Middletown					1	2 34
Milwaukee	2	190 50	2	22 03		
Mobile	111	22,036 20	119	3,438 36	129	4,242 42
Newark	14	642 00	36	209 94	44	225 90
New Bedford	10	639 30	12	165 37	24	263 70
New Berne	4	116 70	1	3 12	6	15 60
Newburyport	8	444 60	8	58 28	29	77 81
New Haven	10	609 00	25	233 46	42	451 44
New London	4	272 10	11	197 07	17	131 73
New Orleans	304	82,829 60	440	21,624 60	591	32,945 10
Newport	2	62 40	9	30 09	14	61 65
Newport News	20	6,066 00	40	1,824 57	25	1,004 85
New York	2,118	490,299 00	3,555	169,897 85	4,721	226,734 51
Norfolk	60	13,468 50	87	3,720 96	79	3,798 15
Ogdensburg	49	1,579 50	121	476 13	18	88 62
Oswego	142	8,076 90	375	2,509 10	72	533 70
Pensacola	254	50,118 80	221	8,346 15	360	13,595 46
Perth Amboy	5	1,548 90	21	891 27	10	368 28
Philadelphia	413	84,227 40	816	35,111 10	1,258	56,744 52
Plattsburg	336	9,704 40	531	1,535 10	580	1,718 34
Plymouth	2	186 00	2	3 66	1	6 15
Port Huron	55	2,449 20	61	248 78		
Portland, Me	86	13,755 60	159	4,436 37	244	6,849 06
Portland, Oreg	2	752 40	1	10 68	54	3,181 20
Portsmouth	5	133 20	21	71 97	63	192 69
Port Townsend	72	11,614 20	160	3,301 95	226	5,494 92
Providence	10	1,014 60	33	235 08	67	337 95
Richmond	13	1,236 60	22	429 60	36	575 84
Rochester	26	1,669 50	99	685 69		
Saco			1	2 64	3	8 37
Salem	23	640 20	56	345 82	77	385 86

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Tonnage-tax receipts at all rates during the fiscal year ending June 30, 1884, &c.—Cont'd.

Ports.	1884.		1885.		1886.	
	No. of vessels.	Amount collected.	No. of vessels.	Amount collected.	No. of vessels.	Amount collected.
San Diego	8	$302 40	38	$428 96	41	$616 44
Sandusky	18	323 70	23	81 60		
San Francisco	385	137,933 10	493	30,986 41	584	31,849 17
Savannah	146	24,097 20	214	7,499 13	248	9,130 32
Shieldsborough	80	14,013 30	50	1,466 94	86	1,808 37
Sitka	4	310 80	4	162 21	10	52 81
Saint Augustine					2	22 26
Saint Mary's	2	158 40			8	151 67
Saint Vincent	1	35 70	8	50 40	9	58 78
Stonington	1	27 60			5	15 09
Suspension Bridge	12	999 00	33	137 40		
Toledo	24	2,149 20				
Waldoborough	34	778 80	177	292 02	259	552 90
Wilmington, Cal	24	9,219 00	25	1,764 73	42	3,216 12
Wilmington, Del	2	159 90	2	12 72	34	698 31
Wilmington, N. C	100	10,736 40	104	2,337 48	154	3,124 56
Wiscasset					6	81 40
Total	7,280	1,295,772 50	12,078	390,875 15	14,176	508,731 77

The proclamations of the President under section 14 of the act of March 26, 1884, are still in force, and vessels from the following ports are exempt from the payment of tonnage tax:

Ports from which vessels are exempt from tonnage tax.	Date of proclamation exempting.
Aspinwall, Panama, } United States of Colombia	February 3, 1885.
San Juan, Porto Rico	Do.
Mayaguez, Porto Rico	Do.
Monserrat Island, West Indies	Do.
All ports in the Province of Ontario, Canada	Do.
San Juan del Norte (Greytown), Nicaragua	March 3, 1885.
Trinidad Island, British West Indies	April 7, 1885.
Bocas del Toro, United States of Colombia	September 9, 1885.

THE CHANGE OF NAMES OF VESSELS.

There continue to be numerous applications for changing the names of vessels of different classes under the act of March 2, 1881, but many of them are for old craft beyond the limit of age fixed by the rules. In such cases only those have been allowed to change the name that have presented proof that as much money had been used in making the repairs as it would cost to build a new vessel of similar character and tonnage. It is often the case that in repairing an old ship the cost is very much in excess of the estimates, and where in such instances the amount swells to a sum equivalent to that of building a new ship outright it would seem to be no more than justice to the owner to allow him to name the vessel anew if he so desired.

There is also considered to be a difference in the trade or employment of vessels making applications for change of name which is duly recognized by this Bureau. The owner of a yacht or tug-boat, or coal-barge would not be regarded as having any intention to deceive the public by making such an application, while in the case of a steamer designed to carry passengers more caution would be exercised. The reasons given for a change of name are sometimes of the most frivolous nature, with no

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possible advantage to be gained by the owner therefrom. However, there are many cases in which the application for change of a vessel's name might be an act of simple justice to an owner who has purchased a vessel with a name unsuited to her intended employment or whose name was objectionable on account of its repetition in the same port or where the vessel has been almost entirely rebuilt and made new in point of seaworthiness. But many applications for such change are made with a view to cover up some bad mark in the history of a vessel or merited prejudice against her.

It is therefore proper that the privileges of the law in this regard should be granted with caution, for such changes often lead to mistakes in the examination of the records of vessels and confound one with another in the comparison of names.

The circular governing the administration of the law on this subject, which has been issued by this Bureau, is given in full below:

The owner of any vessel of the United States desiring to have her name changed under the provisions of these acts, must make sworn application to the Commissioner of Navigation, through the chief officer of customs at her home port, specifying, without abbreviation, the old name and the new name desired; giving in full the reasons for the proposed change, and submitting satisfactory evidence of the seaworthy condition of the vessel, of her freedom from debt, and of the time and place of her building.

A duplicate of the current certificate of inspection from the local inspectors of steam-vessels will be accepted as sufficient evidence of seaworthiness of a steam-vessel. In the case of a sailing-vessel, the owner must procure and present a certificate as to her seaworthiness from the inspector of hulls for the district in which she is at the time of the application, unless this requirement be specially waived by this office. inspectors of hulls are authorized to make examinations of sailing vessels, and to certify as to their seaworthiness. All expenses incurred for this service are to be paid by the owners.

To satisfactorily establish the freedom of a vessel from debt, the owner must, in addition to his sworn statement, produce such a certificate as is provided for in section 4194, Revised Statutes, setting forth that the official records at the home port of the vessel show no mortgage, hypothecation, or other evidence of indebtedness outstanding against her.

The statements in regard to the time and place of building contained in the last marine documents of the vessel will be accepted as satisfactory evidence on those points.

In forwarding such application, chief officers of customs will take care that they are complete; that any repairs contemplated have been made; that the vessel has been inspected and reported on as to seaworthiness, and that evidence is furnished as above set forth. Such officers will please report fully in regard to all the particulars mentioned, in their letters of transmittal, and will specify the newspaper in which it is proposed to publish the change of name. They will also cause the publication of the notice of the change of name, forwarding a copy of the paper containing the notice to this office; and they are hereby authorized to require a deposit in advance of a sum sufficient to cover the expense of publication.

In the case of steam vessels, the new name authorized should be indorsed on the certificate of inspection in force.

Application for change of name of vessels over twenty years old will be rejected; and such change will not be authorized in the case of vessels over ten years old, unless repairs shall have been made equaling in cost 40 per centum of the first cost of the vessel; nor in the case of vessels fifteen years old, unless such repairs shall have been made equaling 60 per centum of the first cost of the vessel.

No change will be authorized of the name of a steam-vessel of which the boilers are more than ten years old.

For the purposes of the act first above cited, the word "enrolled," as contained therein, is held to be equivalent to "documented," and the word "register," to "documenting."

The following is a list of vessels whose names have been changed during the fiscal year ending June 30, 1886:

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List of vessels whose names have been changed under the act of March 2, 1881, during the year ended June 30, 1886.

Official number.	Class or rig.	Old name of vessel.	New name of vessel.	Tonnage.		Home port.	Date of change.
				Gross.	Net.		
106165	St.	Adele	Sylvan Shore	53.24	37.34	New York, N.Y.	April 21, 1886
22418	Sch.	A. J. Covell	Vega	200.26	190.25	Whitehall, Mich.	Mar. 25, 1886
105418	Sch.	Anna Bell	Lygonia	181.27	172.21	Boston, Mass	Mar. 25, 1886
1782	St.	Augusta	Admiral	72.04	55.48	do	May 7, 1886
75725	St. y.	A. T. Kerr	Edith	24.47	19.43	Pittsburgh, Pa.	May 20, 1886
105844	St.	Ariadne	Idlewild	520.36	520.36	Cincinnati, Ohio	June 21, 1886
106366	Slp. y.	Albert Darling	Oquossoc	28.33	26.92	New York, N.Y.	June 24, 1886
711	Sch.	Ariel Patterson	Leo	53.31	50.65	do	April 9, 1886
3271	Sch.	Brown and Murphy.	Ida G. Farren	59.12	56.17	Baltimore, Md.	Jan., 1886
3161	St.	Benj. L. Curtis	Chas. W. Tilden	23.09	11.55	Apalachicola, Fla.	June 19, 1886
4941	St.	Col. R. Ingalls	James McDowell	40.58	38.55	Mobile, Ala	July 23, 1885
5282	Sch.	Clyde	Maggie L. Tolen	24.82	23.58	Philadelphia, Pa.	Sept. 24, 1885
125545	Sch.	Clara M. Goodwin.	Mary E. Bacon	191.33	181.76	Wilmington, Del	Dec. 23, 1885
126272	Sch. y.	Carmelita	Carlotta	43.97	41.78	New York, N.Y.	Jan. 19, 1886
125872	Sch.	Carrie J. Weeks	Viola	9.48	9.01	Shieldsborough, Miss.	Feb. 12, 1886
6361	St.	Dr. John Wolverton.	Mary Louise	36.90	18.49	Philadelphia, Pa.	Dec. 30, 1885
157141	St.	Dream	Governor Hill	30.70	15.71	New York, N.Y.	Feb. 10, 1886
6040	Sch.	Dictator	Andrew Burnham.	90.92	86.37	Boston, Mass	April 13, 1886
9708	Sch.	Four Sisters	William and Richard.	266.27	252.96	do	July 8, 1885
85186	St.	Game Cock	Edward G. Burgess.	64.13	32.07	New York, N.Y.	July 7, 1885
85207	St.	Goldsmith Maid	Gipsy	10.78	10.78	Pittsburgh, Pa.	July 20, 1885
10206	Sch.	Gipsey	Lydia E. Roesser	131.87	125.28	Milwaukee, Wis.	Aug. 10, 1885
76426	Str.	Genesee	Albert V. Bensen, jr.	20.39	16.94	Albany, N.Y.	May 17, 1886
11636	Slp.	Henry Clay	Grover Cleveland.	51.14	48.59	Middletown, Conn.	Aug. 5, 1885
95731	Str.	H. T. Baya	Bay Ridge	669.58	411.41	New York, N.Y.	May 8, 1886
100109	Sch.	Isaac L. Clark	Roger Moore	334.84	318.10	Wilmington, N. C.	Sept. 28, 1885
4941	St.	James McDowell.	Col. R. Ingalls	40.58	38.55	Mobile, Ala	Aug. 24, 1885
76286	St.	Josh V. Throop	A. G. Henry	166.30	166.30	Chattanooga, Tenn.	Mar. 12, 1886
46130	St.	Justin R. Whiting.	Bessemer	352.93	352.93	Chicago, Ill	April 13, 1886
13167	St.	Josephine	Henry E. Bishop	631.47	508.37	New York, N.Y.	April 16, 1886
76095	Sch.	John J. Taylor	Wm. F. Green	267.45	254.08	Savannah, Ga	May 10, 1886
15796	St.	Lizzie McMahon	Katie M. Hagan	17.63	8.82	Philadelphia, Pa.	Feb. 19, 1886
15772	Bg.	Lizzie Zittlosen	Susie Kyffin	284.06	269.86	New York, N.Y.	April 20, 1886
140678	St.	Lewis Pulver	L. Ward	67.04	33.52	do	April 24, 1886
140666	St. y.	Leila	Stella	32.22	26.75	do	June 15, 1886
91310	Slp.	M. Delory	Amelia	7.04	6.69	Newport, R.I	Dec. 12, 1885
90884	St.	May Queen	Frank A. Low	52.67	26.34	Salem, Mass	Feb. 8, 1886
90875	St.	Mary N. Hogan	Sylvia	73.74	36.87	New York, N.Y.	April 3, 1886
91714	Sch.	Mary E	Mary E. Wrightson.	9.85	9.36	Baltimore, Md	April 30, 1886
110483	St.	Nat Wales	Alma	79.15	39.58	Philadelphia, Pa.	July 16, 1885
130021	St.	New Amsterdam.	John J. White	16.03	8.98	New York, N.Y.	Aug. 12, 1885
130254	St.	Nellie	Dick Clyde	76.84	76.84	Burlington, Iowa	Feb. 25, 1886
130195	St.	Northern Pacific No. 2.	Judith	685.23	499.49	Saint Vincent, Minn.	June 22, 1886
150196	Sch.	Pinafore	Charles B. Wood	108.36	102.95	Cape Vincent, N.Y.	Aug. 24, 1885
150120	St. y.	Promise	Loando	42.96	27.16	New York, N.Y.	Dec. 28, 1885
156304	St.	Pickup	Lucile	136.74	106.75	Port Huron, Mich.	Mar. 8, 1886
19701	Slp. y.	Psyche	Wynne	27.61	26.23	New York, N.Y.	May 8, 1886
150202	St. y.	Polynia	Tillie	158.32	100.66	do	May 29, 1886
110351	St. y.	Rival	Iwanda	45.51	28.56	do	April 27, 1886
110511	St.	Rush	Crown Hill	120.83	120.83	Wheeling, W. Va.	July 9, 1885
110279	St.	R. Davis	Fritz Karste	27.71	15.33	Milwaukee, Wis.	July 15, 1885
115517	St.	South Side	J. S. Neel	150.10	150.10	Pittsburgh, Pa.	Oct. 17, 1885
115455	Sch.	Sir William Wallace.	George Asher	37.15	32.29	Freeport, Fla.	Nov. 6, 1885
115846	Sch.	Susie J. Sawyer	Eaglet	130.56	124.04	Port Jefferson, N.Y.	Jan. 21, 1886
115058	Slp.	Salus	Carrie Z	6.50	6.50	Philadelphia, Pa.	Mar. 6, 1886

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List of vessels whose names have been changed under the act of March 2, 1881, &c.—Cont'd

Official number.	Class or rig.	Old name of vessel.	New name of vessel.	Tonnage.		Home port.	Date of change.
				Gross.	Net.		
115857	St. y.	Sophia	Empress	65.35	35.27	New York, N. Y.	April 21, 1886
91106	St.	Storm Signal	Island Belle	46.34	36.30	Bridgeport, Conn.	May 17, 1886
145303	St. y.	Tillie	Talisman	101.71	59.00	New London, Conn.	Feb. 12, 1886
25254	St. y.	Utowana	Oneida	141.38	71.29	Boston, Mass	May 5, 1886
80979	St.	Wilbur A. Heisley.	City of Long Branch.	537.53	475.94	Perth Amboy, N. J.	Oct. 7, 1885
80679	Slp. y.	W. H. Burnett	Brunette	22.40	21.30	Bristol, R. I	April 10, 1886
80889	St.	William St. John.	Island Belle	31.29	15.65	Port Huron, Mich.	April 21, 1886

In this connection I may mention the duplication of names of vessels. Seventy merchant sailing vessels of the United States bear the name of Kate, Katie, &c. There are six U. S. Grants; nine Undines, and as many Unions; twenty-eight Two Brothers, and twelve Two Sisters. Other favorite names are used to as great or a greater extent, causing much confusion as to the identity of the vessels bearing them. Thus, when news is received that the American vessel Two Brothers is wrecked, it requires much explanation and research to ascertain which of the many vessels bearing that name has met with disaster.

It would undoubtedly be for the convenience and benefit of all concerned to have a provision upon the statute-book to the effect that names of vessels of the United States shall not be duplicated, and that no name shall be given to any vessel until it shall be sanctioned by this Bureau, where an alphabetical list is kept. Official numbers are already assigned to vessels by the Bureau, and there would be no difficulty in its readily ascertaining whether any particular name is already in use for a vessel.

It is not intended to suggest that names already given should be changed, but that names borne by vessels should not be given to new vessels at least in the same hailing port.

FOREIGN WRECKS ADMITTED TO AMERICAN REGISTRY.

Disasters to foreign vessels in American waters are becoming more frequent of late years. These vessels are mostly constructed of iron, and being punctured with the slightest touch of the ground they fill and go down, and being abandoned by the foreign owner they are purchased at small expense by some American citizen or citizens, or by some one of the incorporated wrecking companies, and raised and repaired with a view to obtain papers as a vessel of the United States under section 4136 of the Revised Statutes.

The statute referred to reads as follows:

SEC. 4136. The Secretary of the Treasury may issue a register or enrollment for any vessel built in a foreign country, whenever such vessel shall be wrecked in the United States, and shall be purchased and repaired by a citizen of the United States, if it shall be proved to the satisfaction of the Secretary that the repairs put upon such vessel are equal to three-fourths of the cost of the vessel when so repaired.

The regulations made under the above law direct that in case of an application for the registry of a vessel wrecked in the waters of the United States, and purchased and repaired by a citizen or citizens thereof, the applicant must furnish the collector of the port where the

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vessel is brought, proof of the wreck within the waters of the United States, of his title thereto by purchase, of the citizenship of the owner or owners, of the amount of the purchase-money paid therefor, and a detailed statement of the items of expenditure for repairs, accompanied by the bills receipted, which will be submitted by the collector of customs, with the other papers in the case, to the Commissioner of Navigation, who, if he shall find the same satisfactory, and that the repairs have amounted to three-fourths of the entire cost of the vessel, will return the papers to the collector with authority to register the vessel and issue a certificate.

In many of the cases where application is made, the amount is far in excess of the three-fourths required by law, showing that the business is often entered upon at great risk; but, in some cases considerable loss has been incurred by citizens of the United States, who after having purchased wrecks contiguous to the waters of the United States, and raised and brought them to this country and afterwards expended sums equal to three times the original cost, have not been permitted to take out American papers.

In view of the fact that the letter of the law amounts at times to a check upon American enterprise in cases where our citizens are in a position to purchase abandoned ship property on the uninhabited reefs of the West Indies or coasts of Central America, it is suggested that the present legislation be extended so as to cover such cases, and as the outlay in American products is in all cases considerable, the limit as to the requisite proportion for the expense of repairs in this country be changed to one-half instead of three-quarters.

Some doubt having been expressed as to what really constituted a wreck in the meaning of the section, several decisions and opinions of the Attorney-General upon the point are subjoined for the guidance of interested parties.

What is a wreck? A foreign vessel on a voyage to the United States damaged to such an extent as would necessitate her repairs to three times her value, is a wreck in the eye of the law. (*Treasury Decision* 6603, 1868.)

The word "wrecked" as used in section 4136, Revised Statutes, is applicable to a vessel which is disabled and rendered unfit for navigation, whether this condition of the vessel has been caused by the winds or the waves, by stranding, by fire, by explosion of boilers, or by any other casualty. (*Opinion of Attorney-General, December* 5, 1877.)

In order to the granting of a register under section 4136, R. S., it is sufficient if the cost of repairing the vessel, as well where in so doing the original plan of the vessel is departed from, and changes in her construction and internal arrangements are made, new machinery, new appliances for her navigation, and other improvements introduced, as where the vessel is simply restored to what she originally was—equals three-fourths of her value when repaired. (*Ibid.*)

THE NAVIGATION LAWS.

During the last session Congress passed a joint resolution calling for a compilation of the navigation and customs laws by this Bureau. A volume of some five hundred pages, containing the various statutes governing the merchant marine and the seamen of the country, in which is embraced all the laws connected with shipping and the customs, has been prepared and published, the additional labor having been performed during the past few months, without any interference with the routine work of the office.

By reference to this book it will be seen that the navigation laws of the country, based upon the early laws adopted in 1789, 1790, 1792, 1793, 1796, 1797, 1802, 1805, and 1813, stood for many years without any

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material alteration, although some of the provisions of these acts soon became inoperative, and after the last war with Great Britain others were rendered obsolete by the settlement of the questions of impressment of seamen, and those necessitating sea-letters, &c., they continued to stand on the statute book.

Of late years, however, the demands of the times with the new methods of propulsion, as well as those of conducting business connected with maritime affairs, created a necessity for modifying and amending many of the old statutes, and the repeal of others. This was done by sundry acts adopted from time to time, as occasion required, culminating in the more general reform of the navigation laws accomplished by the great measures of relief, passed by the Forty-eighth and Forty-ninth Congresses. These acts (those of June 26, 1884, and June 19th, 1886), operate as amendments to many of the old laws, and spreading out through many pages, suggest the need of a general act designed to supersede all other laws, condensing and consolidating the whole system. Some such plan was thought of as early as 1866, when a resolution to provide for codifying the laws relating to customs, &c., was adopted by Congress.

A bill was then prepared and introduced in the Fortieth Congress, with the earnest commendation of Secretary McCulloch. Although all the provisions of that bill would not apply to the existing situation, many of the changes proposed are excellent, and will form the basis of a new and more modern revision, for if it was then thought necessary to consolidate the laws relating to navigation, there is certainly more need of it now, since so many new measures have been added, rendering the perspicuity of the system still more doubtful. There is also room for further improvement of some of the old laws, which might be made at the same time.

In respect to the documents of vessels, the bill referred to above proposed that every vessel of the United States, of five tons or upwards, be registered, and licensed, also for the particular trade in which she was employed, as foreign trade, coasting trade, or the fisheries. This arrangement would afford the means of at any time ascertaining the actual tonnage of the country engaged in the domestic and foreign trades, as well as in the whale, mackerel, and cod fisheries, which cannot be accurately done under the present system, as both registered vessels and enrolled are employed in the coasting trade.

Yachts should also carry a register; but instead of a license to trade or engage in the fishery, should be provided with a commission to sail as a pleasure vessel; provided that, when at any time such yacht engage in business of any kind she shall surrender said commission, and take out a license for the special trade she is to engage in.

Yachts shall not be permitted to transport goods or carry passengers for pay, and the owner to be required to give bond to that effect. All such yachts to be duly numbered, and required to take out signal letters as prescribed by law for other vessels, and such vessels should be in all respects, except as aforesaid, subject to laws of the United States, and shall be liable to seizure and forfeiture for any violation thereof.

The vessels entitled to be admitted to registry in the bill referred to were those coming within the following five classes, and no others.

First. Vessels built in the United States, wholly owned by a company incorporated or organized under the laws of the United States, or of any State or Territory, or a citizen or citizens of the United States, and commanded by a citizen thereof.

Second. Vessels captured in war by a citizen or citizens of the United States and lawfully condemned as prize, or which may be adjudged to be forfeited for a breach of the laws of the United States, or which may be ordered to be sold in any collateral

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proceeding therein, and purchased by a citizen or citizens of the United States, and wholly owned and commanded by a citizen or citizens of the United States.

Third. Foreign-built ships or vessels wrecked on the coast, or within the waters of the United States, or found derelict at sea, and brought into a port of the United States and legally condemned, and purchased by a citizen or citizens thereof, and subsequeptly repaired at a cost which shall equal one-half of the cost of said vessel when repaired, and wholly owned and commanded by a citizen or citizens of the United States.

Fourth. Ships or vessels built in the United States, or which otherwise have become ships or vessels of the United States, seized or captured and condemned under the authority of any foreign power, and possession recovered subsequently by the original owner or owners thereof, or his or their owners thereof, or his or their executors, administrators or assigns:

Fifth. Ships or vessels purchased by a citizen or citizens of the United States under and by virtue of any lien, mortgage, or incumbrance whatsoever, duly and legally enforced by any court of the United States, or any State court having jurisdiction thereof, either by mesne or final process thereof; ships or vessels built in the United States, or which have otherwise become ships or vessels of the United States, if sold to a foreigner or foreigners, and afterwards, being in a port in the United States, repurchased and wholly owned by a citizen or citizens of the United States, and not having been engaged in any trade prohibited by the laws of the United States; but a register shall not be granted to such ships or vessels so repurchased, until there has been paid a duty on the appraised value thereof of — per cent., to be carrid to the credit of the marine hospital fund.

SEC. 4. The certificate of registry shall be the only passport furnished by the United States to any ship or vessel, except where some other document is or may hereafter be required by treaty, and such certificate shall be conclusive proof of the nationality of such ship or vessel.

Title II of the said act provides for the establisment of marine boards at the principal ports for the examination of officers of the merchant marine service. The general features of this measure, which may be found in the appendix, are in the main similar to those proposed in my last annual report, the latter being more extended in their scope and application to recent requirements.

Title III embodies the legislation governing seamen, much of which has been superseded by the acts of April 7, 1872, and June 26, 1884. There are, however, some points in this title that may be thought to be an improvement on the present laws regarding the discipline of seamen, the outfit of vessels, and relief of destitute and disabled seamen. Under the head of seamen, the whole subject is discussed in this report, and suggestions made for further improvement.

Title VIII, relating to the coasting trade, contemplates the discontinuance of the several great coasting districts; but although the present division appears to be too complex, and quite unnecessary, it might be thought better to rearrange and simplify the system of the great districts, rather than to abolish the distinction entirely, or to retain the present law on the subject.

It is recommended to amend the substance of sections 4348 to 4361 of the Revised Statutes, where they refer to the entrances and clearances of vessels, and divide the coasts into three great coasting districts, as follows:

First. The Atlantic district; to include the coast and rivers of the Atlantic from Canada to Mexico;

Second. The Pacific district; to include the Pacific coast and rivers from British Columbia to Mexico; and,

Third. The Alaska district; embracing the coast and rivers of Alaska.

Only registered vessels of the United States should be allowed to sail between the great districts, whether with cargo on board or not; and properly documented American vessels might carry cargo coastwise without regard to the quantity or value of duty-paid goods on board. Vessels going from great district to great district only should be required to enter and clear, and vessels going beyond State limits only should be required to have manifests.

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The laws governing the fisheries were, it is thought, further improved by the bill recommended by Secretary McCulloch, which also suggested modifications in regard to the entry and clearance of ships and other matters. Indeed, the subject is of such importance to the maritime interests of the country, that advantage should be taken of every suggestion to improve and simplify these laws, and render them as compact as possible.

As a favorable opportunity appears to be afforded to Congress to deal with the various questions arising, it may perhaps be deemed necessary to take steps towards codifying existing laws, introducing therein the provisions of such new legislation as may be considered desirable.

RECENT SHIPPING LEGISLATION.

By the adoption of the shipping act of June 19, 1886, the Forty-ninth Congress, has added another measure of relief of American shipping to the law of June 26, 1884, adopted two years before by the Forty-eighth Congress. These two measures provide (it is estimated) for a removal of taxes, charges, and fees heretofore levied of shipping property of the United States, amounting to over a million dollars annually.

The causes that led to so much favorable legislation are known to all persons interested in ship-building or ship-owning, for it is known that the two are so closely allied that one of them cannot suffer without affecting the other branch of business to a greater or less extent. The war had made it necessary to tax ship property much more heavily than formerly. Such a proceeding on the part of the Government was at that time admitted to be urgent to provide revenue in order to prosecute the war with success.

A tonnage tax was levied and this was subsequently increased and the hospital dues doubled.

The dues and charges were cheerfully paid by the ship owner, especially as ships were then paying good dividends, but when these dues and fees continued to be assessed and collected, many years after the war was over, it became a different question and there was a general cry raised against the unjust tonnage tax.

But the tonnage tax was but a small part of the many grievances borne by ship owners for many years after the war. Although none of them when taken separately were especially onerous, they were oppressive when taken as a whole. The sales of our shipping abroad begun during the war was accelerated by the excessive taxation and our previous regular annual increase of the national tonnage stopped.

In 1861 our tonnage was at its highest point, being 5,559,813 tons. Five years later, in 1866, it was reduced to 4,310,778 tons, having declined 1,229,035 tons during that period. Since the latter date there has been no such sudden change in the tonnage tables, and although the figures have not increased as might have been expected, they have maintained about that amount, varying a little more or less year by year.

There was on this account considerable inquiry as to the cause of the great decline in the national tonnage which occurred during the period referred to. The country became alarmed, and after a few years it became the subject of much inquiry and serious agitation, so that Congress appointed committees, who from time to time made investigations and reports upon the question; but no measure looking to the recovery of our lost prestige on the sea being adopted, a convention of ship

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owners and commercial men was called to meet in Boston in the fall of 1880.

The delegates to this convention were earnest, and many of them able men, appointed by the different boards of trade and commercial bodies throughout the country, and in a session of three days the subject was fully discussed and the opinions of the convention were embodied in a series of resolutions earnestly praying Congress to come to the rescue of the shipping of the country by appropriate legislation.

A general interest was awakened, and at its next session Congress appointed a joint standing committee to investigate the whole subject and report to Congress. The joint standing committee began its labors very properly by sending out to parties interested interrogatories touching upon the subject in all its phases. The various replies to questions propounded by the committee, although not all agreeing in detail, did so in the main and served to elucidate the question. In addition to this, various sessions were held by the committee and witnesses examined.

As a result of this investigation, and the report of the committee which followed, Mr. Dingley brought forward his bill of relief, which was, after some delay, substantially adopted in the act of June 26, 1884.

But this bill, much as it has accomplished, did not do all that could be done to put our shipping on a footing with that of other maritime countries, and two years later Mr. Dingley introduced a supplementary bill which was passed and approved June 19, 1886. This bill, which is sometimes called the fees act, extends the privilege of exemption from charges levied on American shipping abroad, recorded by the act of June 26, 1884, to exemption from similar dues at home, and it is thought that so far as the onerous taxes levied on shipping during and just after the war are concerned, they are effectually removed by this enactment.

Mr. Dunn, the chairman of the shipping committee, made an earnest speech in defense of the measure, in which he remarked that—

> The shipping interests of this country have been undergoing a steady decline for more than twenty-five years. A large mass of the taxes imposed upon the shipping interests which we are seeking to remove were imposed during the war for revenue; they were war taxes, and a necessary incident to the levying of war taxes. They have been imposed for the purposes of government, and not for the benefits of the shipping interest or of vessel-owners * * * and these charges have been laid in order to enable the Government to keep their control of the matter, and for public purposes entirely and alone. Now, I have a statement here from the Commissioner of Navigation showing that, including deterioration (which ship property, unlike other interests, has to bear), the taxes raised upon the shipping interests of the country now reach the enormous sum of 14¼ per cent.
>
> There is not another property interest in the country resting under any such burden as this.

Mr. Parker, of New York, spoke in favor of the measure as a movement in the right direction. In the course of his remaks, which referred more particularly to lake navigation, he said:

> When I see that a single tow of a half dozen barges, coming across the St. Lawrence River to bring freight from Canada to New York, is compelled to pay a tax of $2.50 on every barge to the consular office at the port of shipment as often as the tow may come across, sometimes being four or five times a week, I understand that there is something wrong in our shipping laws which makes such a tax possible. Also, Mr. Chairman, when I see the wreckers of Canada allowed to go into our northern rivers and lakes where an American vessel may be wrecked, and assume the privileges and benefits of removing freight and raising the wreck in our waters, while aid to American vessels by American wreckers is prohibited in Canadian waters; when we see an American vessel, wrecked in Canadian waters, even though convenient to our ports

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or shores, prohibited from receiving aid from an American wrecker, but must be allowed to go to pieces with the destruction of the vessel and cargo while waiting till assistance can be obtained from a Canadian wrecker, I submit that when such a state of things as this exists we must recognize the fact that some reform is needed in our shipping laws. And so I might call attention to many other provisions in which the law is in need of amendment. The theory of our legislation seems to have been to tax ships and tax commerce and tax business, wherever it could be reached in these relations, while upon the other side of our northern rivers and the Great Lakes, Canada, following the course of Great Britain in this direction, has made its shipping practically free. Their charges are nothing, and the Government supports in every possible way the ship-building and the ship-owning interests of Canada. Therefore, while I am ready and glad to support this bill, and will not interfere to embarrass it in any manner, I yet hope that the committee having these matters in charge will so continue their labors as to give further assistance in regard to this important branch of our national interests.

As might have been anticipated, the new law came into force with little or no opposition.

The act referred to, entitled "An act to abolish certain fees for official services to American vessels, and to amend the laws relating to shipping commissioners, seamen, and owners of vessels, and for other purposes," was promulgated to take effect as law on the first of July last. A synopsis of the different sections is given below:

Section 1 abolishes the payment of a large class of fees hitherto levied on shipping, and provides that the same be paid from any money in the Treasury not otherwise appropriated. The fees, which, in the aggregate, are estimated to amount to $300,000 annually, are those mentioned below, the list not including fees paid by foreign vessels.

List of fees paid exclusively by masters and owners of vessels of the United States, otherwise than upon the northern, northeastern, and northwestern frontiers of the United States.

Certificate of registry or record, including bond and oath	$2 25
Indorsement of change of master on certificate of registry or of record	1 00
Issue of certificate of enrollment, including bond and oath	1 10
Each indorsement on certificate of enrollment	20
License, and granting the same, including bond and oath, to a vessel of not over 20 tons	45
If above 20 and not over 100 tons	70
If over 100 tons	1 20
Indorsement on a license	20
Certifying manifest and granting permit for licensed vessel to go from district to district	10
Receiving certified manifest and granting permit on arrival of such vessel	10
Certifying manifest and granting permit to registered vessel to go from district to district	1 50
Receiving certified manifest and granting permit on arrival of registered vessel	1 00
Granting permit to a vessel engaged in the fishery to trade at a foreign port	25
Certificate of payment of tonnage dues	20
Crew-list	25
For recording bill of sale, mortgage, hypothecation, or conveyance of a vessel	50
For recording certificate for discharging and canceling any such conveyance	50
For furnishing a certificate setting forth the names of the owners of any registered or enrolled vessel, the parts or proportions owned by each, and also the material facts of any existing bill of sale, mortgage, hypothecation, or other incumbrance, the date, amount of such incumbrance, and from and to whom made	1 00
For furnishing copies of such records for each bill of sale, mortgage, or other conveyance	50

Fees for the inspection of steam vessels.

For the inspection and examination of steam vessels made for the year, and for furnishing the inspection certificate and the copies thereof:	
For each steam vessel of 100 tons or under	10 00
For every ton in excess of 100 tons	05
For license and inspection of steam vessels used exclusively for pleasure	5 00
(A sum equal to the license fee for vessels of equal burden to be deposited as license fee and the remainder as inspection fee.)	
For the licensing of each master, engineer, pilot, and mate of a steam vessel	50

Fees for shipment of seamen.

TABLE C.—FEES (SEAMEN).

Fees payable on engaging crew, for each member of the crew (except apprentices)	2 00
Fee payable on discharging crew, for each member of crew discharged	50

TABLE D.—FEES (APPRENTICES).

For each boy apprenticed to the merchant service, including the indenture	$ 00

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Fees paid by masters and owners of vessels of the United States upon the northern, northeastern, and northwestern frontiers of the United States.

For the admeasurement of tonnage and certifying the same, for every transverse section under the tonnage deck	$1 50
For each between-decks above the tonnage deck	3 00
For each closed-in space above the upper or spar deck required by law to be admeasured	1 50
For admeasuring spaces to be deducted from gross tonnage, for each exempted space	1 50
For admeasuring yachts and vessels used exclusively for pleasure, per ton of net or register burden	10
For certificate of enrollment, including bond and oath	1 10
For granting a license, including bond and oath, to a vessel not over 20 tons in burden	45
For granting a license to a vessel avove 20 tons and not over 100 tons, including bond and oath	70
For granting a license to a vessel above 100 tons, including bond and oath	1 20
For certifying a manifest, including master's oath, and granting a permit for a vessel to go from district to district, whether belonging to a citizen of United States or otherwise	10
For receiving a manifest, including oath of master, on arrival of a vessel from one collection district at another, whether touching at an intermediate foreign port or not	10
For certifying a manifest, including oath of master, and granting a permit to a vessel under 50 tons, laden with a cargo destined for a port or place in another district at which there is no custom-house	25
For certifying a manifest, including master's oath, and granting a permit to a vessel above 50 tons, laden with a cargo destined for a port or place in another district at which there is no custom-house	50
For certificate to a manifest of a vessel trading from place to place in a district (when required)	20
For recording bills of sale, mortgages, hypothecations, or conveyances of vessels	50
For recording a certificate for discharging or canceling any such conveyance	50
For furnishing a certificate setting forth the names of the owners of any registered or enrolled vessel, the parts or proportions owned by each, and also the material facts of any existing bill of sale, mortgage, hypothecation, or other incumbrance, the date and amount of such incumbrance, and from and to whom made	1 00
For furnishing copies of such records for each bill of sale, mortgage, or other conveyance	50
For certificate of registry, including bond and oath	2 25
Indorsement on register	1 00
For indorsement of change of master on license	20
The fees above mentioned are applicable in the case of all vessels (so far as they concern vessels) navigating the waters of the northern, northeastern, and northwestern frontiers otherwise than by the sea, and no fees other than those above specially enumerated can be legally collected from the owners or masters, *as such*, of vessels (not being steamers) enrolled or licensed on said frontiers.	
Bill of health	20
Crew-list, including bond	25
Certificate of protection issued to seamen	25

Section 2 enables masters of vessels in the coasting trade to make use of the Government shipping offices for the purpose of engaging and discharging crews.

Section 3 deals with advances to seamen by substituting a system of allotment notes which are now allowed in liquidation of any just debt of original creditor for board or clothing.

Section 4 extends the limitation of liability of vessel owners provided by the act of June 26, 1884, to all seagoing vessels, and also to vessels used on lakes or rivers, or in inland navigation, including canal-boats, barges, and lighters.

Sections 5 and 6 establish a penalty of $30 upon any documented American vessel arriving in a port of the United States not having her net tonnage, or official number, legally carved or permanently marked on her main beam.

Section 7 deals with vessels ostensibly transferred to the United States, but not having complied with the law respecting documents, and provides for a fine of $30 on every arrival of vessel found trading or carrying on the fishery without a license, as provided by law.

Section 8 provides that foreign vessels found transporting passengers between ports of the United States shall be liable to a fine of $2 for every passenger landed.

Section 9 authorizes the Secretary of the Treasury to remit the fines enumerated in the above four sections or cases where the offense was not willfully committed.

Section 10 makes the drawback of 75 cents per ton allowed on all bituminous coal imported into the United States which is afterwards used for fuel on board of vessels propelled by steam which are engaged in the coasting trade of the United States, or in the trade with foreign countries, "to be allowed and paid under such regulations as the Secretary of the Treasury may prescribe," only applicable to vessels of the United States.

Section 11 contains an important provision in regard to the tonnage tax, modifying the law of June 26, 1884, so that in lieu of the tax on tonnage of 30 cents per ton per annum imposed prior to July 1, 1884, a duty of 3 cents per ton, not to exceed in the aggregate 15 cents per ton in any one year, is hereby imposed at each entry on all vessels which shall be entered in any port of the United States from any foreign port or place in North America, Central America, the West India Islands, the Bahama Islands, the Bermuda Islands, or the coast of South America bordering on the Caribbean Sea, or the Sandwich Islands, or Newfoundland; and a duty of 6 cents per ton, not to exceed 30 cents per ton per annum, is hereby imposed at each entry upon all

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vessels which shall be entered in the United States from any other foreign ports, not, however, to include vessels in distress or not engaged in trade: *Provided*, That the President of the United States shall suspend the collection of so much of the duty herein imposed, on vessels entered from any foreign port, as may be in excess of the tonnage and light-house dues, or other equivalent tax or taxes, imposed in said port on American vessels by the government of the foreign country in which such port is situated, and shall, upon the passage of this act, and from time to time thereafter as often as it may become necessary by reason of changes in the laws of the foreign countries above mentioned, indicate by proclamation the ports to which such suspension shall apply, and the rate or rates of tonnage-duty, if any, to be collected under such suspension: *Provided, further*, That such proclamation shall exclude from the benefits of the suspension herein authorized, the vessels of any foreign country in whose ports the fees or dues of any kind or nature imposed on vessels of the United States, or the import or export duties on their cargoes, are in excess of the fees, dues, or duties imposed on the vessels of the country in which such port is situated, or on the cargoes of such vessels; and sections 4223 and 4224, and so much of section 4219 of the Revised Statutes as conflicts with this section, are hereby repealed.

Section 12 empowers the President to abolish the tonnage-tax on ships of any country which does not levy a tonnage-tax on foreign ships for lights, &c., or other equivalent tax or taxes.

Sections 13 and 14 relate to slop-chests on vessels engaged in the fisheries, by amending the act of June 26, 1884, so as not to apply to such vessels, and to steam gauges, by amending section 4418, Revised Statutes.

Section 15 extends the privileges of section 16 of the act of June 26, 1884, granted in respect to construction, equipment, repairs, and supplies of vessels of the United States to vessels employed in the fisheries, or in the whaling business.

Section 16 relieves row-boats and skiffs on the river Saint Lawrence from carrying lights under certain circumstances.

Section 17 enables the President by proclamation to exclude foreign vessels from certain privileges in cases where American vessels are discriminated against in foreign ports, and provides for the forfeiture of any foreign vessel or fine and punishment of the offender in case of any act contrary to the prohibitions set forth in the proclamation.

Section 18 amends section 9 of the act of June 26, 1884, by making the rate of transportation of destitute seamen $10 for voyages not exceeding thirty days and $20 for each person for longer voyages when the transportation is by a sailing-vessel, and the regular steerage-passenger rate not to exceed 2 cents per mile when the transportation is by steamer.

No master is obliged to take more than one destitute seaman to every 100 tons burden of his vessel, or to take any seaman having a contagious disease.

AMERICAN NAVIGATION.

The great interests of agriculture, manufactures, and maritime commerce are recognized as the most productive sources of a nation's wealth and independence. The country which is most favorably located for the prosecution of these important industries might reasonably be expected to be the most prosperous, the farthest advanced in the emoluments of wealth and the highest degree of civilization. History, both ancient and modern, affords many examples which teach us lessons on these points, and the rapid rise and development of our country furnishes a striking illustration of the truth of the proposition. In the early period of our existence attention was given to the necessity of fostering these diversified interests in order to establish on American soil a complete economic system which from the exigencies of the time should render us as much as was practicable independent of foreign powers.

Such a policy in the infancy of the nation was wise, and the foresight of the fathers paved the way for a large influx of industrial emigration and for the development of our commerce, which have resulted in the present enormous material welfare of the people of the United States.

The capacity for government shown by the early Americans was, says Lindsay, equal, if not superior, to that of the race from which they descended in their steadfast application of the principles calculated to increase both their own commerce and navigation.

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That this country possessed an advantageous geographical position for the successful prosecution of all these interests was perhaps not so apparent then as it is now.

In agriculture, the vast domain, with its varied climate and fertile soil, that has since been opened up to cultivation, was then a sealed volume, which required the adoption of a system of internal improvements and which was generously granted by the Central Government.

Our pioneers in manufactures had less to encourage them; but they were hardy, laborious, and hopeful, and as necessity in their case was the mother of invention, men with cunning brain and hand solved many a problem that had puzzled them, which resulted in machinery that multiplied the labor of the skilled workmen indefinitely and facilitated production, the demand for which was stimulated by cheapness until the character and quality of American inventions were recognized by civilized nations. But the invention of one year was only the stepping stone to invention and improvement and wider application in the next. And now the general system of our manufactures having been encouraged by a liberal sympathy on the part of the Government embraces every commodity and has reached a degree of perfection which has demanded and obtained a distinct recognition for all that the United States can produce to aid in supplying the wants of the world.

In maritime commerce the necessity of an American merchant marine was early recognized, and although our forests at that day afforded the advantages of cheaper timber for the construction of vessels than most countries possessed, and our extensive coasts were lined with excellent harbors, affording every facility for developing an extensive shipping interest, it was deemed wise to take the ship-building industry under the care of the General Government. Among the first acts of Congress relating to navigation, certain privileges were granted to American-built ships, and these privileges, which had no small influence in promoting early ship-building, are some of them on the statute book to-day. A thriving mercantile marine was rapidly built up under the system thus early inaugurated, which continued to be commensurate with the other two great industries of the nation until the unexpected discovery and adaptation of iron for ship-building purposes. But although iron was made use of in ship-building as early as 1840, it was not till the art of constructing iron ships and steamers had grown to perfection, and the price of the manufactured material had reached a minimum point which enabled the ship-builders of Great Britain to put iron tonnage afloat for about the same cost as the wooden vessels of this country, that the conditions were reversed and the advantages we had enjoyed were transferred to foreign shores.

In looking back over the progress of our merchant shipping, we find that, up to about the year 1840, we built vessels to carry our cotton, tobacco, grain, lumber, &c., to foreign markets, returning with such products as we could get on freight, or purchase with chance of profit; and the supply of tonnage about equalled the demand. In the decade 1840 to 1850 the guano trade gradually opened to foreign-going ships. In this period, also, occurred the famine in Ireland, causing a great demand for our breadstuffs, and vessels to carry it of a more improved build than the cotton ships; then came war with Mexico, and a demand for Government transports, followed by the discovery of gold in California, the emigration thither, and the call for faster ships adapted to lengthy trans-tropical voyages.

In this decade, also, the British navigation laws were repealed, which opened up to us a participation in the carrying trade between Great Britain and all her colonies and East India possessions.

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These events combined to create an era in the carrying trade of the world which became very profitable, and the coasts of New England were studded with ship-yards which continued to prosper until the financial panic of 1857, a result in part of the great over-production that had been carried on. A depression continued until the war which broke out in 1861 created a fresh demand for vessels and offered an opportunity for American ship-owners to sell them abroad. This period was the great opportunity for the small neutral states that had treaties with us to buy our ships, and by their methods of cheaper manning and provisioning they made great profits, stimulating them to increase their tonnage beyond the requirements of trade.

COMMERCIAL TREATIES.

Treaties of commerce are advantageous when the privileges conceded are reciprocal, but not when more of these are given than received. It is feared that some of our commercial treaties operate to the injury rather than to the benefit of the true interests of our mercantile marine.

The trade (in exports and imports) of this country has grown to such vast proportions that what might have been considered a fair exchange of commercial rights and privileges a half century ago is no longer so. To exchange the benefits derived from a carrying trade whose value in merchandise received and sent abroad amounts to over $1,400,000,000 annually, for what some countries, having little or no trade can give us in return is, of course, a simple gift on the part of the United States. The "favored-nation" clause is, notwithstanding, still in force in some of our old treaties with such nations, and although the terms were perhaps fair and equitable at the time they were ratified, it is said that they have of late years operated to the detriment of our shipping, and it is feared that in the future they must militate still more to the disadvantage of our flag.

It is to be hoped that favorable commercial treaties, in which the interest of our merchant marine shall be more fully guarded, will be negotiated in the future.

The question of how much in such cases should be given for a little in return, is a serious one, which our statesmen and diplomatists have, with a proper regard for our maritime interests as well as for the comity of nations, to consider. It was the remark of a distinguished English merchant, Mr. Alexander Baring, when speaking in reference to the shipping interests of Great Britain, that—

> The only beneficial care that a Government can take of its commerce is to afford it general protection in time of war; to remove by treaties the restrictions of foreign Governments in times of peace, and to continuously abstain from any, however plausible, of its own creating.

TONNAGE OF THE UNITED STATES COMPARED WITH GREAT BRITAIN.

It was not until about the time of the beginning of our civil war (1861) that iron ship-building had become sufficiently perfected and the price was reduced low enough to compete successfully with our wooden vessel; but at that time our tonnage, which was 5,539,813, had reached its maximum, and afterwards begun to decline, or scarcely held its own from year to year, while the tonnage of Great Britain went steadily upward until it has nearly doubled in the past twenty-five years. In this connection the following table is interesting, as it exhibits the change in the average cost of the wood and iron ships in this country since 1812. With the amount of our tonnage engaged in the foreign trade the table

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shows the percentage of goods conveyed in American and foreign vessels, with the percentage of tariff; and the tonnage built and tonnage owned in the United States as compared with that of Great Britain. The figures are obtained from various reliable sources and may be depended upon as a close approximation.

The cost of the different classes of vessels at the same period was found to vary considerably, but the figures in the tables represent the average each year as nearly as could be ascertained.

Table showing volume of foreign trade and proportion carried in American and foreign vessels, the ratio of tariff, the tonnage built and tonnage owned in the United States, with the cost of building vessels (wood and iron) here and in Great Britain since 1820.

Year.	Tonnage registered for foreign trade.	Tariff on dutiable goods.	Carried in American vessels.	Carried in foreign vessels.	Tonnage built in United States.	Tonnage owned in United States.	Tonnage owned in Great Britain.	Approximate cost of sailing ships per ton in the United States.				Approximate cost of sailing ships per ton in Great Britain.			
								Wood.		Iron.		Wood.		Iron.	
	Tons.	*P. ct.*	*P. ct.*	*P. ct.*	*Tons.*	*Tons.*	*Tons.*	*Dollars.*		*Dollars.*		*Dollars.*		*Dollars.*	
1821..	593,825	30.99	88.7	11.3	57,275.12	1,298,958	.....	40	to 45	.....	.....	50	to 60	.....	.....
1825..	665,409	50.54	92.3	7.7	116,464.43	1,423,111	.....	38	45	.....	.....	50	60	.....	.....
1826..	698,221	49.26	92.5	7.5	130,373.67	1,534,191	.....	40	45	.....	.....	54	60	.....	.....
1829..	592,859	54.18	89.5	10.5	79,408.6	1,260,798	.....	42	45	.....	.....	50	60	.....	.....
1830..	587,563	61.69	89.9	10.1	58,569.45	1,191,776	2,531,819	42	45	.....	.....	55	60	.....	.....
1831..	538,136	47.38	86.5	13.5	85,556.58	1,267,846	.....	.....		.....	.....	.....		.....	.....
1832..	614,121	42.96	83.1	16.9	144,544.16	1,439,450	.....	41	46	.....	.....	55	62	.....	.....
1833..	648,869	38.25	83.80	16.2	161,492.30	1,606,151	.....	40	45	.....	.....	55	60	.....	.....
1834..	749,378	40.19	85.00	17.0	118,389.84	1,758,907	.....	.....		.....	.....	.....		.....	.....
1835..	788,173	40.38	84.50	15.5	75,107.89	1,824,941	.....	40	47	.....	.....	55	65	.....	.....
1836..	753,094	34.94	84.30	15.7	116,230.41	1,882,102	.....	.....		.....	.....	.....		.....	.....
1837..	683,205	29.18	82.6	17.4	125,913.58	1,896,686	.....	.....		.....	.....	.....		.....	.....
1839..	702,400	31.77	84.3	15.7	125,260.69	2,096,479	.....	.....		.....	.....	.....		.....	.....
1840..	762,838	34.39	82.9	17.1	121,203.86	2,180,764	3,211,538	45	48	.....	.....	60	65	.....	.....
1842..	823,746	35.00	80.0	20.0	129,806.30	2,092,391	.....	.....		.....	.....	.....		.....	.....
1843..	856,930	29.19	77.1	22.9	63,888.24	2,158,603	.....	.....		.....	.....	.....		.....	.....
1844..	900,471	36.88	78.6	21.4	103,537.29	2,280,096	.....	.....		.....	.....	.....		.....	.....
1845..	904,476	34.45	81.7	18.3	146,042.46	2,417,002	.....	45	50	.....	.....	60	65	80	to 100
1846..	943,307	33.35	81.7	18.3	188,203.93	2,562,085	.....	.....		.....	.....	.....		.....	.....
1847..	1,047,454	28.02	71.1	28.9	243,633.40	2,839,046	.....	.....		.....	.....	.....		.....	.....
1848..	1,168,707	26.28	72.5	27.5	318,075.54	3,154,042	.....	.....		.....	.....	.....		.....	.....
1849..	1,258,756	26.11	75.0	25 0	256,988.82	3,334,016	.....	.....		.....	.....	.....		.....	.....
1850..	1,439,694	27.14	74.0	26.0	279,255.80	3,535,454	4,232,962	45	48	.....	.....	65	70	75	90
1851	1,544,663	26.63	73.6	26.4	299,572.41	3,772,439	.....	.....		.....	.....	.....		.....	.....
1852..	1,705,650	27.38	72.8	27.2	355,356.19	4,138,440	.....	.....		.....	.....	.....		.....	.....
1853..	1,910,471	25.93	74.0	26.0	427,494.79	4,407,010	.....	.....		.....	.....	.....		.....	.....
1854..	2,151,918	25.61	71.8	28.2	536,046.13	4,802,902	.....	.....		.....	.....	.....		.....	.....
1855..	2,348,358	26.82	74.5	25.5	583,450.04	5,212,001	.....	45	50	.....	.....	65	70	70	80
1856..	2,302,190	26.05	75.2	24.8	469,293.73	4,871,653	.....	.....		.....	.....	.....		.....	.....
1857..	2,268,196	22.45	70.5	29.5	378,804.70	4,940,843	.....	.....		.....	.....	.....		.....	.....
1858..	2,301,148	22.43	73.7	26.3	244,712.87	5,049,808	.....	.....		.....	.....	.....		.....	.....
1859	2,321,674	19.56	66.9	33.1	156,602.33	5,145,038	.....	.....		.....	.....	.....		.....	.....
1860..	2,379,396	19.67	66.5	33.5	214,797.65	5,353,868	5,710,968	47	50	85	to 100	65	75	65	75
1861..	2,406,894	18.84	65.2	34.8	233,194.35	5,539,813	.....	47	51	85	100	.....		.....	.....
1862..	2,173,537	30.20	50.0	50.0	175,075.84	5,112,164	.....	47	52	85	95	.....		.....	.....
1863..	1,926,886	32.62	41.4	58.6	311,045.81	5,155,056	.....	47	53	87	95	67	76	66	76
1864..	1,486,749	36.69	27.5	72.5	415,740.64	4,986,400	.....	46	54	85	100	.....		.....	.....
1865..	1,518,350	47.56	27.7	72.3	394,600.70	5,096,782	.....	48	55	80	100	70	75	65	75
1866..	1,387,756	48.35	32.2	67.8	336,146.56	4,810,778	.....	49	55	81	100	.....		.....	.....
1867..	1,515,648	46.67	33.9	66.1	305,594.86	4,304,487	.....	48	54	80	95	.....		.....	.....
1868..	1,494,389	48.70	35.1	64.9	285,304.73	4,351,759	.....	49	54	80	95	70	76	62	72
1869..	1,496,220	47.36	33.1	66.9	275,230.15	4,144,641	.....	50	53	77	95	.....		.....	.....
1870..	1,448,846	47.15	35.6	64.4	276,053.31	4,246,507	7,149,134	50	52	75	90	70	75	60	70
1871..	1,363,652	44.50	31.9	68.1	273,226.51	4,282,607	.....	50	53	77	90	.....		.....	.....
1872..	1,359,040	41.47	29.1	70.9	209,052.22	4,437,747	.....	50	53	75	90	.....		.....	.....
1873..	1,378,533	38.50	26.3	73.7	359,245.76	4,696,027	.....	50	52	80	90	71	97	60	67
1874..	1,389,815	38.61	27.1	72.9	432,7.5.17	4,800,652	.....	50	52	75	85	.....		.....	.....
1875..	1,515,598	40.69	26.2	73.8	207,638.79	4,853,732	7,744,237	50	52	75	80	70	75	60	65
1876..	1,553,705	44.80	27.6	72.4	203,585.63	4,279,458	.....	51	52	75	80	71	76	59	66
1877..	1,570,600	42.45	26.9	73.1	176,591.06	4,242,600	8,133,837	51	53	74	80	72	77	58	66
1878..	1,589,348	42.81	26.3	73.7	235,503.57	4,212,765	.....	51	53	73	85	73	77	57	66
1879..	1,451,505	44.95	22.0	77.0	193,030.69	4,169,601	.....	51	55	72	81	74	78	56	65
1880..	1,314,402	43.56	17.5	82.5	157,409.90	4,068,034	8,467,171	52	54	70	80	75	80	55	65
1881..	1,207,035	43.25	16.2	83.8	280,458.64	4,057,734	8,575,560	50	55	68	80	75	80	54	63
1882..	1,259,492	42.70	15.9	84.1	282,269.73	4,165,933	8,796,517	50	54	65	77	72	78	54	63
1883..	1,269,681	42.64	16.3	83.7	265,429.91	4,235,487	9,131,418	48	54	65	75	75	80	52	63
1884..	1,276,972	41.70	17.5	82.5	225,514.00	4,271,229	9,314,496	50	55	65	75	75	80	50	60
1885..	1,262,814	46.07	17.0	83.0	159,056.19	4,265,934	9,000,000	48	55	60	70	75	85	46	55
1886..	.....	.....	.....	.....	.....	.....	.....	45	55	60	68	75	85	45	55

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By following the figures in the several columns, the almost regular decline in the cost of iron ships in both countries may be noted, though it was much more rapid in Great Britain than with us, and the gradual rise is seen in the cost of vessel property constructed of wood.

The trade of constructing iron ships was developed first in Great Britain, as our mining facilities were not far enough advanced to compete on a large scale at that day. The experience which English shipbuilders were gaining in that particular trade gave them a great start of us, and they were able to reduce the cost of an iron hull to that of a wooden one as early as 1860. But wood being much cheaper in this country, there appeared to be no pressing call for the building of iron ships at a greater cost. Even now the two kinds of vessels cost about the same, and it is only because iron is so much more suitable for steamers that much progress is made in the construction of vessels of the latter material.

The steadily increasing cost of wooden-ship property in this country and the steady decline in the cost of iron ships in Great Britain, seem to have settled the shipping question, as seen by the tables, as between England and America. But there is much truth in the assertion so frequently heard, that high-tariff rates, by enhancing the price of materials, has a depressing effect upon our ship-building industry.

To put this country on a level with Great Britain in building vessels, no article that enters into their construction here should be weighted with a tax from which the foreign ship-builder is free. The Government should not interpose to increase the cost of the vessel by imposing a tax which is first paid by the builder and then by the purchaser. It cannot be stated too often, or with too great emphasis, that American vessels in the foreign trade must compete with the vessels of the world. The tax is over and above what would have been paid for the vessel, collected at a time when the Government does not need the money and legislation is expected to reduce taxation.

As American ship-building is an important branch of trade, whatever can reduce the cost of ships goes to the profit of the merchant, and finally reaches the American people, who are interested in cheap American-built ships, as well as cheaper articles of consumption brought by them as cargoes, for whatever assists the one aids the other. Were all materials for ship-building free it would help to equalize the higher wages paid to American shipwrights. Ships may well be built cheaper in Great Britain, as the materials are untaxed and wages lower. The wages of an American ship-yard are always a considerable item.

I am aware, in presenting this statement, that while the country is in debt a tariff is a necessity. But in view of the present reported revival in trade throughout the land, there is also a prospect of such revival reaching our shipping interests. For busy ship-yards are a sure mark of commercial prosperity. And I think that the lightening of the tariff burdens on the materials for ship-building would go far to silence complaint, and enable builders to supply the market with cheaper vessels, and to build them to order at a more satisfactory price to the merchant or owner.

While the condition of prices as to materials and labor was so much against this country, rendering it difficult to compete for foreign commerce, American ship-owners were compelled to turn their attention more to the development of the coasting trade, from which other nations were excluded.

As a consequence, we have the largest and best equipped fleet for coast, lake, and river navigation of any country. The demands of our

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vast system of lakes and rivers have been met by a supply of vessels for freight and passenger business that are better adapted to their particular lines and trades than can be found elsewhere.

Indeed, the relative growth of our river passenger boats compares favorably with that of the progress made in English ocean steamships, if we take into account the difference called for in their construction and accommodation.

A great many things enter into the economy of ship building and ship using, so that it is difficult to weigh these subjects in all their bearings. Overproduction, which would in a short time settle itself, is said to have been the principal cause of the decline in the freighting business, but it was not entirely so, or of the continuance of the depression, as a falling off has been found in the volume of products carried during the past few years. The passenger traffic of the world has undoubtedly been increasing, and a considerable portion of the steam tonnage of Europe has been almost exclusively employed in that business, but it is said that a perceptible decrease has been observed in the imports and exports of the great staples of trade at the principal seaports of the world.

It is admitted that a serious depreciation has been going on for some time in the value of the shipping property of all maritime nations.

No class of property is so subject to sudden rise and fall, and in no class of property is there such steady and continual decline. Fourteen years is said to be the average life-time of a wooden ship, and if we include all kinds of iron vessels with their liability to so many different dangers, the great bulk of them do not appear to last any longer. And it is observed that for a series of years there is a continued decline in the value of shipping property of 7 to 8 per cent. per annum.

When we add to this regular falling off, a further decline resulting from an unexpected fall in freights, the shipowner who is suddenly compelled to wind up his affairs, sustains a loss that is ruinous.

But if the losses by depreciation in the shipping trade are sometimes enormous, the profits have in times of urgent demand for tonnage been known to repay all losses. An unexpected demand takes place for tonnage in some quarter of the globe where shipping is temporarily scarce, and half the value of a vessel has been known to be cleared in a single voyage. It is said that after a dull period in all branches of trade, shipping is the last to feel the pulse of returning prosperity; and this would be only the natural result of the law of cause and effect. The prices of commodities must change so as to admit of a profit in transporting goods from country to country.

It is encouraging to note, in looking over past commercial history, that the return of prosperity in the freighting business has always come unexpectedly, usually upon the eve of a period more or less lengthy of depression.

A number of enterprising firms have, from time to time, notwithstanding the disadvantages under which they labor, engaged in the business of building iron vessels in this country, and the quality of the vessels constructed has been improved so as to compare favorably with those of other countries. With regard to labor, it may be said that, although the daily price of labor in this country is much higher than abroad, it is believed that labor with us is more efficient, in that it produces more in the same time. The relative efficiency of labor in different climates is a factor of no small account in ship-building, where it is estimated that by far the greater part of the expense goes for that item. Calculations have been made on this subject which are said to prove that the average day's work of a man in a temperate climate is

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of considerable more value than it is in a warm, debilitating latitude, and this probably (in part, at least) accounts for the greater prosecution of the ship-building business in the Northern and Middle States.

The importance of establishing plants for the construction of iron ships on a large scale in this country cannot now be overestimated, and as there would, at the present stage of development of the trade and rate of prices in this country, be a fair prospect of successful competition, it might be well for Government to aid private associations in the establishment of such plants by contracting for the building of the vessels for the Navy at certain favorable locations for carrying on the business distributively along the coast. The capital required to build a plant would be large, even for a wealthy concern, which would expect a profit on the investment, and it seems proper in such a case that the Government should indicate its intention to employ the plant in the building or repair of iron vessels, for a period named, as an encouragement for the establishment of such important works. The plan would enable the Government, through the rivalry of competition, to secure good, well-built ships at a minimum of cost and at the same time provide the means for carrying on iron ship building by private firms.

It is said to have been ascertained abroad that men-of-war constructed in private yards cost less than when built by the employés of the Government. If the United States would aid in establishing such yards in connection with private concerns, reserving the right to call upon them for Government work when required, would it not be a step in the right direction, by providing a safe-guard against being some day caught without means to provide iron ships necessary for our defense. As was said by President Madison:

> If America should have vessels at all she should have enough for all the purposes intended—to do her own carrying, to form a school for seamen, laying the foundation of a navy, and to be able to support herself against interference of foreigners.

Attention has been called to the growing importance of the trade of this country with our South American neighbors in a letter lately addressed to the Assistant Secretary of State by the United State consul at Barranquilla, Colombia. The bulk of the commerce of the Empire of Brazil and the adjoining Republics might reasonably be expected to flow to the United States under the American flag, since it belongs to us by proximity of territory as well as the natural sympathies of the people engaged in it, and their common interests. The value of establishing steam lines running to the ports of those countries cannot easily be overestimated, and I annex the letter referred to, which elucidates the subject by showing the enterprising spirit of rivalry that exists among foreigners in their competition for the possession of this trade:

> UNITED STATES CONSULATE,
> *Barranquilla, August* 30, 1886.
>
> SIR: It has been stated by a distinguished citizen of the United States "that American bottoms had not lost the foreign trade, but had relinquished it, because it was not worth having," and, considering the importance of the carrying trade of the United States with the world in general, and South America in particular, as the one great factor needed to advance American prosperity, I desire to submit a few facts touching the relinquishment of this foreign trade by American bottoms because it was not worth having.
>
> There are six European lines of steamers plying directly between England, France, Germany, and Spain, and this port and other Carribean ports. Steamers belonging to these lines call at this port ten times per month, outward bound, and ten times per month, also, homeward bound. In dollars and cents, that means for this port alone, not less than a trade of seven millions annually, without speaking of the treasure, gold and silver, in bars or dust, that leaves this place for Europe. There is now $300,000 worth of such treasure in this place; it has just been received from the mining dis-

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tricts and awaits the first steamer for Europe. Last year the total shipment of treasure from this port amounted to two millions and a quarter; this year it is calculated this amount will be nearly doubled.

I speak here only of this port; I refer strictly to the produce and treasure coming to and leaving from Barranquilla, only one of the half dozen places at which European steamers call while in this region. It is safe to put the whole trade of the Caribbean Sea with Europe, at $40,000,000 to $50,000,000.

The steamers coming here are laden with cotton goods, iron, cloths, cutlery, canned provisions, machinery, furniture, and everything else that can be enumerated in or out of the line of general merchandise, as they come, and are loaded down with coffee, hides, tobacco, rubber, cocoa, quina-bark and every other product known to this country, besides gold and silver, as they go back.

These six lines employ a fleet of some forty steamers, with a total tonnage of not less than 100,000 tons registry. And not only are these respective lines paying expenses, but they are doing well; they are prosperous, since every now and then substantial improvements are made on their equipments, and larger and better ships added to the number, either to increase their carrying capacity or to replace old ones not any longer fit for the requirements of a much increasing traffic.

Does this look "as if the trade was not worth having?" And it is well, too, to make note of the fact that Europe has taken this hold here since American bottoms were made to give up this trade, "but never relinquished it," as was facetiously said, because it was not worth having.

The following are the several European lines referred to:

(1) The Royal Mail Steamship Company (English), with a total tonnage registry of 30,000.

(2) The Compagnie Générale Transatlantique (French), with a total tonnage registry of 25,000.

(3) The German line (Hamburg), with a total tonnage registry of 20,000.

(4) The West India and Pacific Steamship Company (English), with a total tonnage registry of 16,000.

(5) The Harrison line (English), with a total tonnage registry of 15,000.

(6) The Spanish line (Cadiz), with a total tonnage registry of some 12,000.

And what has the United States to show against such a display of European enterprise in our own maritime court-yard, so to speak? Only one line—just one solitary line—the Pacific Mail Steamship Company, sailing direct from New York to Colon and back, never calling at this port, the most important in Colombia, nor any other port but Colon. Moreover, the bulk of the trade of the Pacific Mail Steamship Company is Asiatic.

There is, however, one New York line, called the Atlas Steamship Company, sailing between New York, Kingston, Colon, Barranquilla, and other seaports of the Caribbean Sea, but it is not an American line. It is an English line, sailing from New York for the benefit of English capitalists, and at the expense of American bottoms.

Why, if "this trade is not worth having," do we find English bottoms take a hold of it even at New York?

The Atlas line calls at this place twice per month. It is the only New York line calling here, and its agent at this place is no less a personage than the English consul at Barranquilla; thus putting the American trade between New York and this port altogether at the mercy of English influences. Under such circumstances just imagine the position of the American consul here.

The Atlas Steamship Company from New York has a line of splendid steamers, with a total tonnage registry of not less than 20,000. It may safely be added to the six other European lines above referred to.

Then there is another line of steamers sailing from New York, but never touching any port in Colombia. It sails direct between the American metropolis and Venezuela, lying directly east of Colombia. It also is a superb line of steamers; but, alas, like all the rest, it is an European line, and is called the Red (D) line.

Now, then, "if this foreign trade is not worth having," why is it that foreign bottoms so eagerly take hold of this trade at our very house, from our very doors, in New York itself? Have not European nations good reason for vaunting over the decadence of the American merchant marine?

Yet, we Americans are wholly responsible for it; and yet, too, we all know of our actual commercial superiority, in these seas at least, over all of Europe combined, if we only saw fit to exercise our national powers.

But if this trade "was not worth having," is it probable that capitalists in Europe would invest millions in that trade; and add millions to it every year, because of the increasing demands of a trade which, forsooth, "is not worth having?" I dare say that American bottoms are as fit for this trade as European bottoms. I dare say that the geographical situation of the United States, as compared with the same situation of European countries, is in our favor by at least 2,000 miles; and I further dare say that American industry would be greatly benefited if American bottoms

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were enabled to fill their hulls with American products, instead of allowing European bottoms to carry European products as well as our own, to this market, and thus monopolize, to our detriment, the trade of Colombia, the richest country in national resources of all South American Republics. The American flag is never seen in these seas, there, where of all places, it ought to be seen; there, where, of all places, the American flag really belongs.

It is because European countries can manufacture cheaper than the United States that they occupy this field.

Methinks not, since these very same several kinds of American manufactured goods have been sent from the United States to Europe, where they undersold the domestic products, and, if enabled to undersell European goods on their own grounds, three or four thousand miles away from home, why ought not American goods equally to undersell European goods here, nearly two thousand miles, yes, nearly three thousand miles nearer the United States.

Again, why is it, "if this foreign trade is not worth having," that the only American line of steamers navigating these waters is enabled to give $10,000 per month as a subsidy to a New York line of English bottoms not to interfere with its freight from New York to Colon? If this traffic is not worth having, why this large subsidy to monopolize a very small fraction of it?

In my humble opinion, the foreign trade reported as not worth having, is not only worth having, but should be had. I would deem it a blessing for this and adjoining countries, as well as for the United States, if American bottoms were once again enabled to occupy the field that they once so proudly, so well, and so successfully occupied.

What is needed for that purpose it is for American legislators to determine; but I imagine that if American capitalists with seafaring dispositions were left untrammeled, if not unshackled, they would soon find a way to put American bottoms afloat in at least American waters, without the least fear of the consequences, and perhaps extend their trade world-wide over all the seas as in the happy commercial era of yore.

I am, sir, your obedient servant,

VICTOR VIFQUAIN,
Consul.

Hon. JAMES D. PORTER,
Assistant Secretary of State, Washington, D. C.

SHIPPING OF THE UNITED STATES.

The sea-going merchant shipping of the United States afloat at the beginning of the present year numbered 6,481 vessels of all classes, measuring 2,566,926 tons. Of this number, 379 were steamers of an aggregate tonnage of 506,668, and 6,102 of 2,060,258 tons were sailing vessels; but the entire number of documented vessels under the flag on June 30, 1886, was 23,534, and their tonnage, 4,131,135.83.

The estimated value of the entire mercantile marine of the United States was set down last year at about $180,000,000. There has been a fictitious depreciation going on during the year, which has had the effect to lower the marketable value of the shipping of the world. As this condition of things is forced, being brought about by a temporary overproduction of floating property, and a corresponding falling off in the demand for vessels, I do not consider that it affects the general average, which, to be justly accurate, should be based on the cost, making the usual allowance for the regular annual depreciation according to age. Adopting this method of calculation, I find the value of the shipping of the country nearly the same as last year.

TONNAGE.

The tonnage tables do not show any increase in the merchant shipping of the country, taken as a whole, when compared with the preceding years. There is, however, a gain in the iron tonnage, showing that the construction of iron vessels is increasing. The exhibit of the gross tonnage shows a decrease of 104,351 tons from 1883, of 140,093 tons from

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1884, and of 134,798 tons from 1885. Below are given the totals of the national tonnage:

Vessels according to documents.

Documents.	1883.		1884.		1885.		1886.	
	No.	*Tons.*	*No.*	*Tons.*	*No.*	*Tons.*	*No.*	*Tons.*
Registered.....	2,174	1,302,094.65	2,127	1,304,220.67	2,119	1,287,998.51	1,769	1,111,179.13
Enrolled and licensed	22,043	2,933,392.60	21,955	2,967,008.21	21,844	2,977,935.28	21,765	3,019,956.70
Total	24,217	4,235,487.25	24,082	4,271,228.88	23,963	4,265,933.79	23,534	4,131,135.83

The following table exhibits the vessels in respect to their different character or the class of work they are intended to perform:

Class.	1883.		1884.		1885.		1886.	
	No.	*Tons.*	*No.*	*Tons.*	*No.*	*Tons.*	*No.*	*Tons.*
Sailing vessels	16,697	2,336,556.77	16,658	2,414,008.43	16,532	2,373,884.03	16,018	2,210,203.21
Steam vessels.	5,249	1,413,193.73	5,401	1,465,908.80	5,399	1,494,917.31	5,467	1,522,983.90
Canal-boats	1,186	118,186.35	1,012	96,130.42	1,027	97,681.16	1,035	98,742.82
Barges.....	1,085	317,550.40	1,011	295,181.23	1,005	299,451.29	1,014	299,205.90
Total	24,217	4,235,487.25	24,082	4,271,228.88	23,963	4,265,933.79	23,534	4,131,135.83

It may be observed from the foregoing tables that the registered tonnage of the country has decreased 193,041 tons in two years, and decreased 176,819 tons during the past year, while the enrolled and licensed tonnage has increased 52,948 tons in two years, and increased 42,021 tons during the past year. The proportion of sailing tonnage registered last year was 46 per cent., and this year it is 42; while the steam tonnage registered last year was 12.4 per cent., and this year it is 11.6 per cent.

The sailing tonnage has decreased 163,680.82 tons during the past year; but the steam tonnage has increased 28,066.59 tons. The canal-boat tonnage has increased 1,061.66 tons, and the barge tonnage has decreased 245.39 tons.

The falling off in the tonnage of the country, as shown by the tables, is more apparent than real. Greater care has been taken than formerly to eliminate from the lists all vessels lost, wrecked, abandoned, or sold abroad, and the records therefore for the present year show a larger tonnage of those classes. The actual losses, however, considerably exceeded those of the previous year. Thus, the records show that the tonnage of vessels lost at sea and wrecked exceeded that lost last year by 57,666 tons; that the tonnage abandoned at sea exceeded that abandoned last year by 7,872 tons; and that the tonnage of vessels sold to foreigners exceeded that so sold in 1885 by 6,850 tons, making the losses in the aggregate exceed the losses of last year by 72,388 tons, or more than half of the amount of the whole reduction in the tonnage.

UNITED STATES VESSELS ENGAGED IN FOREIGN TRADE.

The tonnage tables classify vessels of the United States in respect to steam and sail and wood and iron, and also as regards their documents, registered or enrolled and licensed. The latter division was presumed

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to indicate the trade in which the vessels were engaged, whether foreign or coastwise (the registered being in the foreign and the enrolled and licensed in the coasting trade); but such division has necessarily been erroneous, as many vessels on the lakes, none of which are registered, are actually engaged in foreign trade. Moreover, some registered vessels occasionally go in the coastwise trade without changing their papers.

Pains have been taken to examine the list of vessels of the United States and ascertain the whereabouts and employment of each vessel at the close of the fiscal year, separating those that were actually employed in the foreign from those in the coastwise trade.

With the exception of those on the northern lakes the vessels under our flag employed in foreign commerce on June 30, 1886, including those vessels trading between ports on the Atlantic and Pacific coasts, amounted to 1,445, with a measurement of 1,028,734.30 tons. The annexed table shows a classification of these vessels with the number and tonnage:

Class.	1885.		1886.	
	No.	*Tons.*	*No.*	*Tons.*
Steamers	113	134,036.82	111	128,570.52
Ships	308	468,117.64	298	444,775.00
Barks, barkentines, and brigs	569	327,347.07	630	329,019.80
Schooners and sloops	471	130,763.20	406	119,368.68
Total	1,461	1,060,264.73	1,445	1,028,734.30

AMERICAN VESSELS ENGAGED IN COASTWISE TRADE.

The coasting fleet of the United States is by far the most important of the two in this division of the mercantile marine. The total number of vessels employed in the coast and river trade of the country, including the fisheries of the Atlantic and Pacific coasts (excepting the Northern lakes), was 20,129, of 3,368,575.26 tons, on June 30, 1886.

The following table shows the class and character of these vessels as returned at that date:

Class.	Number.	Tonnage.
Sailing vessels	14,783	1,927,884.05
Steam vessels	4,187	1,141,076.10
Canal-boats	246	26,541.02
Barges	913	273,074.09
Total	20,129	3,368,575.26

The total number of vessels engaged in the coastwise trade, excluding those engaged in the fisheries and upon the Northern lakes and Western rivers, is 17,038, and their tonnage 2,929,830.10.

The coasting trade of the United States from the beginning has been reserved for the vessels of the national flag, and having now grown to be far more extensive and valuable than that of any other country it is not probable that it will ever be exchanged for what any other nation could give us in kind. The extent of our territory, bordering as it does on two oceans, with the chain of inland lakes bounding the northern frontiers, the whole country being intersected by numerous navigable rivers, demands a large coasting fleet, which has been developed with great rapidity.

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With a succession of magnificent bays, harbors, and sounds, extending from the Passamaquoddy on the east to the Chesapeake, with ports already formed by the hand of nature capable of sheltering in safety an unlimited fleet of ships, with long navigable rivers, at the same time peculiarly adapted to steam navigation, it is no matter of astonishment that our people should have directed their energies and resources to the development of a fleet of coasters and iron steamers that excel in their adaptation to the service they are intended to perform. Here was the greatest field for American maritime enterprise, and our people improved the opportunity by building a marine that has been and continues to be a splendid success.

COAST LINE OF THE UNITED STATES.

A calculation made by the Coast Survey in 1853 gives the total main-shore line of the United States (exclusive of bays, sounds, inlands, &c.), 12,609 statute miles. If all the bays, sounds, and islands be included, the shore-line will be swelled to 21,856 miles, as follows:

Coast.	Main shore line, including bays and sounds.	Islands.	Rivers.	Total.
Atlantic coast	6,851	6,328	.....	.....
Gulf coast	3,467	2,217	.....	.....
Pacific coast	2,281	702	.....	.....
Total	12,609	9,247	.....	.....

The shore-line of the Northern lakes, inclusive of bays, sounds, and islands, is estimated to be 3,620 miles, making a total of 25,476 miles.

To this must be added the coast of the Territory of Alaska, 3,000 miles in extent. The sout coast of Alaska, 1,400 miles, has some trade, though as yet the whole Territory is comparatively undeveloped, and the northern coast only partially explored.

River navigation.—An estimate of the river navigation of the country is also given, from which it appears that the shore-line of the Atlantic and Gulf States to head of tide-water is 11,711 miles. The department of what are known as the Western rivers, 35,644 miles, which are not tidal and embrace the Mississippi division, as follows: Rivers which empty into the Atlantic and Gulf of Mexico, excepting the Mississippi, including islands, bayous, and tributaries, excepting those enumerated below, 11,128; the Yazoo and Big Black, and bayous, 1,190; the Red River and tributaries, 4,924; the Arkansas and tributaries, 3,250; the Missouri and tributaries, 7,830; the Ohio and tributaries, 7,342.

Total, including both shores of Atlantic and Western rivers, 47,355 miles. Rivers on the Pacific coast, 1,710. Total shore line of rivers in the United States, 49,065.

SHIP-BUILDING.

The ship-building industry is so intimately connected with and dependent upon ship using that any material falling off in the latter business brings on a depression in the former. The decline in the freighting markets of the world has had the effect to cast a cloud of increasing stagnation over our shipyards. There is, however, still consider-

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able activity in some quarters, especially in the direction of coasters and small craft.

The following table shows the class, number, and tonnage of the vessels built in this country during the last four years:

Class.	1883.		1884.		1885.		1886.	
	No.	*Tons.*	*No.*	*Tons.*	*No.*	*Tons.*	*No.*	*Tons.*
Sailing vessels	721	137,646.17	706	126,620.88	523	65,362.46	405	41,236.89
Steam vessels	439	107,229.78	410	91,327.47	338	84,332.75	240	44,467.82
Canal-boats	42	4,710.91	33	3,456.43	21	2,283.39	23	2,978.83
Barges	66	10,443.05	41	10,109.22	28	7,077.59	47	6,769.85
Total	1,268	265,429.91	1,190	225,314.00	920	159,056.19	715	95,453.39

From the foregoing it appears that the amount of shipping constructed during the past year has decreased 63,602.80 tons, and during the past two years 129,860.61 tons.

The vessels of all classes built in the United States during the past four years, apportioned in respect to the several grand divisions of the country, are shown, with their tonnage, in the table below:

Grand divisions.	1883.		1884.		1885.		1886.	
	No.	*Tons.*	*No.*	*Tons.*	*No.*	*Tons.*	*No.*	*Tons.*
Atlantic and Gulf coasts	881	193,610.60	877	167,798.38	646	109,971.82	496	58,544.00
Pacific coast	91	16,737.97	85	10,620.48	76	11,037.67	58	5,913.92
Northern Lakes	171	28,638.42	135	30,480.82	117	26,826.33	85	20,400.54
Western rivers	125	26,442.92	93	16,664.82	81	11,220.37	76	10,594.93
Total	1,268	265,429.91	1,190	225,514.00	920	159,056.19	715	95,453.39

It will be observed by examination of the above table that 66 per cent. of the tonnage of the country has been built on the Atlantic seaboard, 7 per cent. on the Pacific coast, and 16 per cent. on the Northern lakes, while the Western rivers have supplied the balance, about 11 per cent. If we subdivide the grand divisions into States, we find that Maine stands first, with — per cent.; Pennsylvania second with — per cent.; New York third, with — per cent.; Delaware fourth, with — per cent.; Massachusetts fifth, with — per cent.; Michigan stands first among the Lake States, with — per cent., being about half the tonnage required for lake navigation. Kentucky, with — per cent., stands first, and Ohio second in the division of the Western Rivers.

IRON-SHIP BUILDING.

The apparent boundless extent of our forests, filled with an unlimited supply of every variety of timber, afforded great encouragement to the first settlers on these shores to build vessels.

The art of wooden ship-building was learned early, and that branch of industry has been prosecuted with energy until a recent date. A number of years ago the construction of vessels of iron was begun on an extensive scale on the Delaware and other places, and since that time there has been a gradual falling off in the tonnage of wood vessels built, and an increase in the tonnage of vessels constructed of iron. But the cheapness of wood as compared with iron still continues to operate against the latter in this country. But probably the most formidable obstacle that our ship-builders now have to encounter in beginning iron-ship building is the expenditures they have to make in starting the business, which precludes the possibility of small concerns which carry on wooden-ship building from entering upon the business.

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In wooden-ship building the plant consists of only the yard and working shops for men, while for building iron vessels a considerable outlay in the supply of tools, as well as the necessary boiler and engine and machinery, are required. The cost of these articles is estimated at about $50,000, but is being reduced every year. The following is a calculation of the present approximate value of a plant suitable for building iron ships, with facilities for one large ship of any size on the stocks at a time:

Buildings and foundations, say	$12,000
Railways and cranes	3,000
Engine and machinery, pumps, &c	5,000
Shafting and pulleys	5,000
Blacksmith shop and fittings	2,000
Steam-hammer	1,000
One furnace	2,000
One lathe and one drill	1,200
Two countersinks	1,200
One frame-bending slab	1,200
One pair of rolls	3,400
Three punching-machines	2,500
One planer, and one pair shears	3,000
Small tools and hand-tools	4,000
Sundries	3,000
Total	49,500

It is encouraging to note that while the ship-building industry of the country has in the aggregate been falling off the last ten years the construction of iron vessels of different kinds has steadily increased. The decline in the price of the raw material, together with the gradual development of the art of fashioning it into fine specimens of maritime architecture, has cheapened the cost of the manufactured article, and gradually operated to give an impetus to that industry. A number of fine steel vessels have also been constructed.

During the past year iron and steel vessels of 14,908 tons have been built in the United States. The following table shows the development of the iron-ship building industry:

Iron tonnage built since 1869.

Years.	Sailing vessels.	Steam vessels.	Total.	Years.	Sailing vessels.	Steam vessels.	Total.
1870	679	7,602	8,281	1879	....	22,008	22,008
1871	2,067	13,412	15,479	1880	44	25,538	25,582
1872	.....	12,766	12,766	1881	36	28,356	28,392
1873	.....	26,548	26,548	1882	.....	40,097	40,097
1874	.....	33,097	33,097	1883	2,033	37,613	39,646
1875	.....	21,632	21,632	1884	4,432	31,199	35,631
1876	.....	21,346	21,346	1885	731	43,297	44,028
1877	.....	5,927	5,927	1886	692	14,216	14,908
1878	.....	26,960	26,960				

The table below gives the grand divisions in which iron-ship building has been carried on during the past four years:

Grand divisions.	1883.		1884.		1885.		1886.	
	No.	*Tons.*	*No.*	*Tons.*	*No.*	*Tons.*	*No.*	*Tons.*
Atlantic and Gulf coasts	881	193,610.60	877	167,798.38	37	32,581.83	22	10,607.15
Pacific coast	91	16,738.97	85	10,620.48	2	2,189.57	.....	.....
Northern lakes	171	28,638.42	135	30,430.82	6	9,186.17	3	4,204.05
Western rivers	125	26,442.92	93	16,664.32	3	126.72	1	96.72
Total	1,268	265,429.91	1,190	225,514.00	48	44,028.29	26	14,907.92

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SHIPPING OF THE NORTHERN LAKES.

The division of the Northern Lakes, which includes Lakes Superior, Michigan, Huron, Erie, and Ontario, comprises a chain of fresh-water seas, extending over 1,500 miles, with a varying breadth of from 100 to 400 miles. The navigation of these inland waters commenced with the settlement of the country, and has grown up rapidly, keeping pace with the development and commercial requirements of the fertile region which borders the shores.

The large and increasing commerce carried on upon the Northern lakes is essentially a coasting trade. Vessels of the United States which navigate those waters are enrolled and licensed and may be employed in the coasting trade or to foreign ports on the Canada shores of the lakes, and are in other respects subject to the regulations made to prevent any violation of the revenue laws.

The channels that connect the lakes, which were in the beginning, some of them, intricate and shallow, have been deepened, and made navigable for craft of considerable tonnage and draught of water, so that the size of the vessels employed has been steadily on the increase and with this the cost of transportation has as regularly declined. In the year 1855 the largest vessels were only about 500 tons, and the expense of transporting grain from Chicago to Buffalo was over 12 cents per bushel on an average. The depth in the Saint Clair River was then about 9 feet. In 1874, when the depth had been increased to about 16 feet, and the size of the vessels had correspondingly augmented, the expense of transportation had decreased to 4 cents per bushel. In 1885, after the completion of the lock in the Sault, and vessels carrying over 2,000 tons of grain were able to load at the port of Marquette on Lake Superior, the cost of transportation was reduced to nearly 2 cents per bushel. This remarkable reduction in the cost of carrying the Western crops to market, represents an enormous gain to the country, the saving in the commerce done at the port of Marquette alone having been estimated at $3,763,401.65. Unfortunately, however, this great saving is not entirely legitimate, the overproduction of tonnage which resulted from former high freights having caused an abnormal condition of the freighting business on the lakes in the same manner that it affected commerce on the oceans. It may, however, be remarked that there has been a marked improvement in the freighting business of the lakes during the present year over the season of 1885, which was a year of great general depression. A late number of the Cleveland Marine Record, in commenting upon the ship-building prospects on the Northern lakes, says:

With $2 freight on ore from Marquette, $1.75 from Escanaba, 4½ to 4¾ cents on grain from Chicago, 6½ to 7 cents on wheat from Duluth, 90 cents on coal from Buffalo, and $1 from Cleveland up, vessel owners have taken courage and show their faith in the prosperous condition of lake traffic at present and the promise for several seasons to come by investing largely in new shipping. A season of depression in business circles is always followed by one of prosperity. The bottom was reached last season when lake business languished throughout the entire year, and vessels were laid up by the score early in September. This season the contrary is the rule, tonnage is scarce at the rates quoted above. Capitalists, realizing this fact, and believing in a continued demand that will return them a good rate of interest on their investment, are bent on building, notwithstanding the fact that many good freight boats have already been put afloat to compete for cargoes this season.

A review of the present orders for new ships will be of interest. Cleveland, being the center of ship-building, comes first on the list with ten new boats, three steamers at the Globe Iron Works Company, one of large size, of steel, for the Cleveland Transportation Company, one of steel for H. H. Brown and others, and the other for a Chicago syndicate, represented by Mr. Ira Owen. At William Radcliffe's yard timber is already arriving for two wooden freight steamers of large proportions, one for Capt.

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George Berriman and others, and one for Messrs. Bradley, Grover and others. At Quayle's Sons' yard, which has recently been enlarged, four vessels have been ordered, three of which are well under way, two schooners for the Wilson Transit Line, one of which will be converted into a steamer, and two steamers for Moore & Bartow.

At Presley & Co.'s yard a fine freight steamer is being built for Messrs. Palmer & Johnson. The Detroit Drydock Company has contracts for building two wooden steamers at the Detroit yards and two at the yards at Wyandotte, all of which will be large carriers. At the iron yard in Buffalo the Union Drydock Company are making preparations to build a large steel steamer for the Union line, to be followed by others as speedily as possible, and at Mills & Co.'s yard a large wooden freight steamer is already well under way. At F. W. Wheeler's, West Bay City yard, workmen are busy laying down three large freighters, and Mr. Davidson, who has sold all of his fleet, is engaged on a large steamer for his own account. At Milwaukee, the Milwaukee Shipyard Company, which has just launched a fine steamer, will at once commence work on another, and at Wolf & Davidson's yard the steamer now on the blocks will be replaced by another of like model. Then follow the ports with one ship capacity, Trenton, Marine City, Mount Clemens, Saint Clair, Grand Haven, all of which are busy on capacious freight boats, those at Simon Langell's Saint Clair yard and Morley's Marine City yard being the largest ever built at those ports.

It has been announced in the dailies that the tonnage now under way is the largest ever put afloat in any one season, but that is not the case. We can cite a number of years since 1817, when 1,250 tons were built, that exceeded the present year both in number and tonnage, and it is interesting to note that prosperous seasons followed great additions to the lake fleet. In some cases the new boats paid for themselves in a single season and were sold at the beginning of the next season for more than their original cost.

Iron-ship building for lake navigation was commenced at an early day, and now after twenty years of experience that art is well perfected and largely carried on at the ports of Buffalo, Cleveland, Wyandotte, &c.

The tables submitted with this report show that the number of iron vessels built at the lake ports in the fiscal year ending June 30, 1886, was 3, and the number of iron vessels documented at that date was 41, with a tonnage of 40,736.54.

Reference to those tables shows that the number of vessels documented in the various customs districts of the Northern lakes at the end of the fiscal year was 3,405, and the total tonnage 762,560.57. Of this number 1,280 vessels, of 381,907.80 tons, were steamers; 1,235 vessels, 282,319.16 tons, were sailing craft, and the remaining 890 vessels, of 98,333.61 tons, were canal boats and barges.

THE WESTERN RIVERS.

The division known as the Western Rivers, embracing the Mississippi and its tributaries, is the theater of a vast system of inland navigation now carried on chiefly by steamboats and barges.

In the year 1814, the first steamboat was launched on the waters of that great river, and it was subsequently shown to be practicable to stem the swift-descending current of the mighty stream by means of steam. From that time steamboats rapidly increased in numbers as well as in size and the power of their engines, so that as early as 1832, there were no less than nine hundred arrivals of steamers at New Orleans from points on the river, and in the year 1834, two hundred and thirty steamboats were plying on the rivers Mississippi and Ohio. These steamers were most of them built at Cincinnati and Pittsburgh, and some of them were of considerable size, but their navigation was at first attended with many difficulties and dangers.

Numerous sand-bars impeded the channel of the upper rivers, and in the spring floating ice was met with, but snags and sawyers were the most dangerous obstacles encountered. Of the sixty-six boats lost in the years 1831–1833, over one-third were reported "snagged." These impediments, however, are now mostly removed.

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In former times the explosion of boilers was one of the great dangers met with in the navigation of the Mississippi. Although condensing-engines are now met with, there were a large proportion of them high-pressure, the pressure being in some cases as high as 30 pounds to the square inch. To operate these, wood, as well as coal, was commonly used for fuel, and in the times of exciting competition pitch, rosin, and even tallow were sometimes thrown into the furnaces by reckless engineers, some frightful explosions with terrible loss of life being the result. The boats on the Mississippi vary in size from 300 to 1,500 tons, but they do not increase in dimensions of late years. The Eclipse, the largest boat on the river, was built at Saint Louis in 18—.

The following is a list of the steamboats of about 300 feet in length that have been on the Western rivers:

Name.	When built.	Where built.	Length.	Breadth.	Depth.
Henry Ames	1864	Saint Louis, Mo.	300.8	42	7.5
Ruth	1865	Louisville, Ky	300	45.2	7.3
Robert E. Lee	1866	New Albany, Ind.	285.5	46	9
General Lytle	1866	Cincinnati, Ohio	290	40	6
Richmond	1867	Madison, Ind	340	50.6	8.7
Great Republic	1867	Pittsburgh, Pa	296	50.5	9.6
Belle Lee	1867	Jeffersonville, Ind	291	42.4	8.4
James Howard	1871	do	322	55.4	10
Charles Morgan	1873	Cincinnati, Ohio	302.2	43.4	7.6
John A. Scudder	1873	do	299.6	50	8.2
Mary Bell	1875	Metropolis, Ill	316.1	56.2	10.8
Grand Republic	1876	Saint Louis, Mo	338.8	56.8	9.2
Robert E. Lee	1876	Jeffersonville, Ind	315	48.8	9.2
Centennial	1876	Saint Louis, Mo.	295.1	41.6	7.5
Charles P. Chouteau	1877	do	296.7	54	7.6
J. M. White	1878	Jeffersonville, Ind	312.6	47.8	10.2
Guiding Star	1878	Cincinnati, Ohio	304	41.6	7.1
Annie P. Silver	1878	do	298.6	40.7	8.8
Ed. Richardson	1879	Jeffersonville, Ind	303	48.6	9.9
Natchez	1880	Cincinnati, Ohio	302.2	46.8	9.6
Fleetwood	1880	do	302.2	43.4	6.4
City of New Orleans	1881	Jeffersonville, Ind	290	48	8.5
City of Baton Rouge	1881	do	290	48	8.7
Will S. Hays	1882	Pittsburgh, Pa	301	77	9
City of Saint Louis	1883	Jeffersonville, Ind	300	49	8.6
City of Bayou Sara	1884	do	300	48.4	9.1
City of Natchez	1885	do	300	48.4	9.3

The number and tonnage of documented vessels on the Western rivers at the close of the last fiscal year, as compared with those documented the two preceding years, are exhibited in the following statement:

State.	1884.		1885.		1886.	
	No.	*Tons.*	*No.*	*Tons.*	*No.*	*Tons.*
Louisiana	138	20,834.85	127	20,147.83	125	20,395.66
Mississippi	34	3,750.99	35	3,940.97	33	2,858.74
Tennessee	111	21,769.05	106	20,422.41	104	20,528.75
Kentucky	62	18,826.77	74	17,315.09	80	18,493.97
Missouri	279	169,953.80	283	167,346.88	270	163,351.44
Iowa	68	9,352.05	68	9,128.22	73	9,815.64
Nebraska	19	3,787.46	21	4,013.28	22	3,636.56
Minnesota	60	8,271.10	56	7,416.37	59	8,010.15
Wisconsin	43	3,626.31	40	3,666.65	41	3,383.25
Illinois	48	6,589.14	42	6,035.57	24	2,577.81
Indiana	67	8,710.09	60	8,727.89	55	8,198.62
Ohio	101	31,610.42	110	32,746.76	106	31,594.03
West Virginia	109	14,583.83	112	13,479.07	101	10,475.45
Pennsylvania	164	34,689.08	155	31,667.20	155	31,581.92
Total	1,303	356,355.54	1,289	346,054.19	1,248	334,901.99

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THE PACIFIC COAST.

The ports that have grown up on the Pacific coast stand in a distinct and separate relation to the ports on the Atlantic seaboard. Indeed the voyages between the eastern and western coasts of the United States extending around Cape Horn, are among the longest voyages that ships in the freighting business are ever called upon to make, and are considered by seamen in the same sense as foreign voyages, although the particular trade is reserved to vessels of the United States as properly belonging to the coasting trade.

The rapid development of the commerce of the Pacific ports filled a threatened vacuum in the freighting business of the world, occurring at the same period that the extensive trade in Peruvian guano which employed a great deal of shipping was declining.

American ship-owners were not slow in availing themselves of this opening trade by building ships more suitable for the carriage of grain; and although the business is of late years becoming more common to shipping of foreign countries, and has not been so lucrative as in former years, it affords employment for a large fleet, the exports of cereals amounting to from twelve to fifteen million centals annually, besides a great many barrels of flour, boxes of salmon, and other products. The export trade in coal and lumber from Puget Sound ports has also grown to large dimensions. Six hundred and forty-two cargoes (mostly composed of coal and lumber) were reported as shipped from different places in Washington Territory during the past year.

The port of San Francisco, from its proximity to the Pacific whaling ground, enjoys great advantages for prosecuting the whale fisheries, which were early availed of, and now she has, next to New Bedford, the largest whaling fleet of any port in the United States. Forty whaling vessels, eight of them steamers, now sail from the port.

Until within a comparatively recent date, ship-building on the Pacific coast was confined to small vessels designed for the coasting trade.

The size of the vessels constructed has, however, been regularly increased until now there is a fleet of vessels of considerable size, some of them capable of undertaking long voyages.

The great depression existing for some time past in the shipping trade has of course had an effect to reduce the business of ship-building here as well as elsewhere.

The following table shows the ship-building of the Pacific coast during the past ten years:

Vessels of over 50 tons built on the Pacific coast since 1876.

Years.	Sailing vessels.		Steam vessels.		Total.	
	No.	Tons.	No.	Tons.	No.	Tons.
1877	13	2,588	8	2,937	21	5,525
1878	21	2,501	10	3,086	31	5,677
1879	7	921	10	7,540	17	8,461
1880	13	3,574	13	5,080	26	8,654
1881	30	7,754	7	1,986	37	9,740
1882	38	10,519	8	3,382	46	14,091
1883	33	7,277	16	5,259	49	12,536
1884	8	937	15	4,200	23	5,137
1885	14	1,669	28	8,622	42	10,291
1886	15	2,518	13	2,757	28	5,275

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The following statement exhibits the tonnage of the Pacific coast June 30, 1886:

State.	Number.	Tonnage.
California	885	248,132.93
Oregon	191	56,806.43
Washington	177	42,120.37
Alaska	20	624.98
Total	1,273	347,684.71

THE FISHERIES.

The fisheries, which have been aptly called the agriculture of the seas, have always been considered so important and honorable an employment as to deserve the special protection of the Governments of maritime nations. The business of fishing has only been prosecuted upon an extended scale since the discovery of Newfoundland. Although the Dutch and some of the Italian states had fisheries of some extent as early as the fifteenth century, they were circumscribed by a limited knowledge of maritime matters; and it was not till the voyages of Cabot made known the great value of the cod and other fish that swarmed in the American seas, that fishing as a business was regularly followed. From this time expeditions to carry on cod-fishing were from time to time fitted out in England.

After the lapse of a century we find these expeditions increasing in number, and employing large bodies of men, so that much importance became attached to the occupation as a nursery for seamen. All kinds of fishing is more or less difficult and prosecuted with danger, the men having frequently to encounter storms in open boats, and sometimes vessels go down with whole crews, which perish together.

It is said that the French were the pioneer cod fishers in the American waters, and there is a tradition among the fishermen of Brittany that their ancestors crossed the Atlantic to Newfoundland before the time of Columbus. However this may be, we know that France was the first European possessor of all these territories, and it is said that early in the sixteenth century vessels carrying the flags of France, Spain, and Portugal, as well as Holland, came annually for fish to supply the Catholic countries of Southern Europe, and many fortunes were accumulated by the traffic.

The motive of Francis I in fitting out a French expedition in 1534 is stated to have been to found a colony in the neighborhood of the fishing grounds.

The French dominion, which was gradually stretched from the Bay of St. Lawrence to the Mississippi, doubtless had its origin in the fisheries.

The prize of the fisheries then contended for induced France to value so highly the renunciation by England of sovereignty in Canada, Acadia, and Cape Breton, by Charles I, under the treaty of St. Germains. The wars and treaties which followed between France and England from the time of Cromwell to the capture of Quebec, in 1759, were so many struggles and contentions for possession of the territory that controlled the most important fishing grounds in the world. But, finally, after nearly another century of claims and counter-claims, Great Britain won the coveted prize almost completely, nothing remaining to France of her vast North American possessions but the small islands of St. Pierre and Miquelon. These two islets still continue to be the center of a great fishing trade, and large fleets of French vessels cross the Atlantic annually to carry on the trade in the Newfoundland fisheries. Moreover,

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France has depended in a great measure upon the fisheries for her seamen for the navy.

It will be remembered that in 1778, when she had need of great levies of seamen to man her fleet, the Newfoundland fishermen were called upon, showing the importance with which their services were regarded.

The fisheries are now commonly divided into two classes, the deep-sea and the shore fisheries. The former, which is common to all nations, embracing all departments of the business that are prosecuted at sea or outside the shore line; and the latter embracing those under the control of the nation owning the shore along which the fishery is carried on within the three-mile limit. But the question as to the boundary and extent of the the three-mile limit, whether from headland to headland or following the course and bends of the coast, is still unsettled, as also that of the doubtful right of other nations to use the shore for purposes of curing fish caught in the deep sea. Disputes relative to the American fisheries have occasionally risen since their importance became known and recognized. These differences have from time to time been adjusted by treaties negotiated between this country and Great Britain. The most recent of these treaties (1872) having expired some months ago, our fishermen have, since that time, been excluded from the privileges enjoyed under it, it being claimed by the Canadian authorities that the old convention of 1818 is at present the only rule by which to be guided in their relations with our fishermen. Moreover, certain legislation has been adopted, interpreting this treaty in a way to operate to their prejudice, so that in some cases fishing vessels have been seized, and alleged outrages committed. These practices are quite contrary to that spirit of comity that should exist between friendly nations, but it is presumed some arrangement will soon be made which will secure to our fishermen their former rights.

Our fishermen have from the beginning been especially favored by national legislation. The fishery act of 1813 provided for the paying of bounties to fishermen—a law which continued in force for more than half a century. A law of 1866 provided for a drawback on salt supplied to fishermen.

It is known that a few years ago efforts were made to develop deep-sea fishing on the Pacific coast, especially off the coast of Oregon and the Territory of Washington. It is understood that a survey of the banks was made by persons resident in Portland, Oreg., who were interested in those fisheries, and that the services were obtained of fishermen experienced in the use of the trawl-net, one draught of which was reported as yielding 3 tons of fish of various kinds, among them being the ordinary cod, rock-cod, tom-cod, black bass, skate, hake, sole, plaice, flounder, halibut, brill, and some animals and fish that could not be named. The habitat of almost all the fish caught was either at or near the bottom of the ocean, and the value and importance of this fishery was early demonstrated.

The vessels employed in trawling for deep-sea fish are of a special character, demanded by the experience gained in the work of fishing. At first a small sail-boat of some 20 tons capacity was sent out with the trawl, but its unsuitableness was shown when the net was brought to the surface with its contents, as it had to be cut to pieces to enable the fishermen to pick out the fish as best they could. The kind of boat, therefore, found to be needed was a fishing-smack of about 75 tons burden, to be used along the shores of the Pacific Ocean, as such boats could run into Astoria, Oreg., and deliver the catch of the trawls. It seems that in the early days of this deep-sea fishery it was the practice of the fishing vessels to land their fish at Astoria.

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The enterprise is meritorious and deserves the success it has achieved, and when to this is added the salmon fishery on the rivers running into the Pacific Ocean, and in that ocean itself, with its canning industry, it will readily be seen that the fisheries on the Pacific coast are assuming importance and swelling greatly the volume of fish as a food supply for the people.

The whale fishery of this coast is also of growing importance, as mentioned elsewhere in this report.

The sea fisheries are divided, for the sake of convenience in numbering the vessels from year to year, into two classes: (1) The cod and mackerel fishery; (2) the whale fishery.

The number of vessels and amount of their tonnage engaged in these fisheries during the past four years is exhibited in the table below:

Fisheries.	1883.		1884.		1885.		1886.	
	No.	*Tons.*	*No.*	*Tons.*	*No.*	*Tons.*	*No.*	*Tons.*
Cod and mackerel.	2,249	95,038.22	2,101	82,940.31	1,803	82,564.89	1,739	80,704.81
Whale	141	32,414.05	121	27,248.94	113	25,183.76	104	23,138.36
Total	2,390	127,452.27	2,222	110,189.25	1,916	107,748.65	1,843	103,843.17

In the following statement is shown the tonnage employed in the whale fisheries for the last four years, except the tonnage on the Pacific coast, which has not been returned separately from the other registered vessels. It is known, however, that six steam whalers, built and equipped at San Francisco, besides several sailing vessels (about forty vessels in all), are engaged in the whale fishery. These should properly be added to the Atlantic fleet shown here.

Ports.	1883.		1884.		1885.		1886.	
	No.	*Tons.*	*No.*	*Tons.*	*No.*	*Tons.*	*No.*	*Tons.*
Boston, Mass	5	794.87	3	286.26	3	286.26	3	286.26
Barnstable, Mass	12	1,126.63	11	1,023.43	12	1,107.69	12	1,107.69
Edgartown, Mass	5	891.28	6	998.33	4	583.46	2	408.50
New Bedford, Mass.:								
Sail	110	27,602.44	93	23,450.21	87	21,810.16	80	19,939.72
Steam	3	1,298.39	2	790.27	2	790.27	2	790.27
New London, Conn	6	700.44	6	700.44	5	605.92	5	605.92
Total	141	32,414.05	121	27,248.94	113	25,183.76	104	23,138.36

The following table shows the amount of tonnage from each State employed in cod and mackerel fisheries during the years 1884, 1885, and 1886:

States.	1884.		1885.		1886.	
	Tons.	*Per cent.*	*Tons.*	*Per cent.*	*Tons.*	*Per cent.*
Maine	21,147.84	25.50	20,980.94	25.41	20,785.18	25.75
New Hampshire	607.26	.73	661.90	.80	614.75	.76
Massachusetts	45,370.83	54.70	45,941.12	55.64	49,402.92	61.21
Rhode Island	1,962.50	2.37	1,718.62	2.08	1,946.06	2.41
Connecticut	3,488.03	4.20	4,024.10	4.86	3,196.50	3.96
New York	8,648.54	10.42	4,683.19	5.67	4,203.88	5.21
New Jersey	78.50	.09			17.28	.02
Maryland	540.33	.65				
Virginia	468.31	.56	231.13	.28	32.26	.03
North Carolina	112.14	.14	44.50	.05	33.22	.04
Florida	414.53	.50	418.67	.51	391.10	.49
Alabama	61.96	.07				
California	54.54	.07	3,865.72	4.70	61.96	.08
Oregon					30.70	.04
Total	82,940.31	100.00	82,564.89	100.00	80,704.81	100.00

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YACHTS.

In the beginning yachts were vessels of state, used chiefly for the transportation of ambassadors, or the accommodation of distinguished personages, in their voyages of recreation; so that finally the pleasure vessels of private individuals came to be known by the name of yachts. The more modern use of the term is to designate pleasure craft sufficiently large for a sea voyage, and sometimes model boats, built for speed in racing; and under the laws of this country the owners or builders of yachts are at all times to permit the naval architects in the employ of the United States to examine or copy the models, &c.

By the act of March 3, 1883, section 4214 of the Revised Statutes was repealed, and the following substituted, which embodies the main features of the present law in respect to yachts:

SEC. 4214. The Secretary of the Treasury may cause yachts used and employed exclusively as pleasure vessels, or designed as models of naval architecture, if built and owned in compliance with the provisions of sections 4133 to 4135, to be licensed on terms which will authorize them to proceed from port to port of the United States, and by sea to foreign ports, without entering or clearing at the custom-house; such license shall be in such form as the Secretary of the Treasury may prescribe. The owner of any such vessel, before taking out such license, shall give a bond in such form and for such amount as the Secretary of the Treasury shall prescribe, conditioned that the vessel shall not engage in any trade, nor in any way violate the revenue laws of the United States, and shall comply with the laws in all other respects. Such vessels, so enrolled and licensed, shall not be allowed to transport merchandise or carry passengers for pay. Such vessels shall have their name and port placed on some conspicuous portion of their hulls. Such vessels shall, in all respects, except as above, be subject to the laws of the United States, and shall be liable to seizure and forfeiture for any violation of the provisions of this title: *Provided*, That all charges for license and inspection fees for any pleasure vessel or yacht shall not exceed $5, and for admeasurement shall not exceed 10 cents per ton.

Further legislation with the view of amending and improving the yacht laws is proposed by the introduction of a bill in the present House of Representatives, and if the provisions of the bill were changed so as to be in accord with the general interpretation of our navigation statutes, it would not be objectionable. But a general revision of the laws governing the documenting of vessels has been proposed, and if the suggestion is acted upon, that will afford an excellent opportunity to modify the statutes relating to yachts.

By reference to the American Yacht List, published in 1885, it will be seen that a large proportion of yachts do not have official numbers. It is considered desirable that owners of all vessels of this class be required by law to take out official numbers, and to report losses, so that an accurate record of them may be kept.

THE AMERICAN YACHT.

While the merchant marine during the past decade has hardly kept pace with the general advance. nothing, perhaps, in the nautical line is so indicative of the general prosperity as the wonderful development of the yachting interest. The capital invested in a fleet devoted mainly to the pursuit of pleasure during a few months of the year is already so enormous as to deserve consideration as an important feature of the maritime growth of the country.

Until about 1870, the New York Yacht Club was the only one in which any pretensions were made to own and sail first-class yachts. Since that time the growth of the different clubs that have sprung into existence, from year to year, has been something remarkable. In 1870, some 20 steamers, 100 schooner-yachts, and about 300 sloops, in all

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some 400 vessels, made up the yachting list of the Atlantic seaboard, while to-day 150 steam-yachts, 250 schooners, and 400 sloops, with a host of small craft, nearly 2,000 in all, join the annual regattas in search of "cups."

The international races of the past ten years have excited a widespread and general interest in the matter of yacht designing and construction; so much, indeed, that the main questions at issue have become plain to every one, and it is not unreasonable to suppose that this interest will continue to grow until the fleet of pleasure yachts, already large, rivals in numbers that of our foreign-going merchant fleet.

The American Yachting List, published annually by the New York and Eastern yacht clubs, shows already a great many vessels duly classified, with tonnage dimensions, builders' and owners' names, and home port.

The New York Yacht Club was organized in 1844, the first in the country, and from that time until 1870 there were just a dozen in all, but during the past fifteen years their number has increased to sixty. There was, however, always a large fleet of small craft sailed by their individual owners, who, as the yachting subject gained in importance, joined together and formed yacht clubs.

Concerted action of this kind has brought about the results which the international contests of the past ten years have clearly elucidated. A marked improvement is noticed in yacht designing, construction, and rig, the drafting of the sail and spar plans, and in the balancing of the vessel. Until the subject received this general attention these details were left entirely to the builders, riggers, and sail-makers, their productions being the aggregate result of former precedent, a general rule of thumb, and a good deal of blundering and guess-work construction, and while the yacht of to-day is not entirely a thing of engineering calculations, her construction approaches more nearly an exact science than before the time when the clubs taking the matter seriously in hand, determined to produce in a good sea-going craft a yacht of unrivaled speed and beauty.

As a result we see not only a marked improvement in the appearance but also in the performance of the American yacht under all kinds of circumstances and weather.

The ideas embodied in foreign models have all been tried and tested, those features alone being retained which were found conducive to a material advantage. This process of evolution, rapid as it has been, has already produced a distinct type of vessel known as the "American yacht," a vessel peculiarly adapted to the requirements of our large bays and shallow waters, but combining in her design and rig some of the best features of the English boat.

The shallow "skimming-dish," our original conception of a fast sailer, has had to yield in many points to modern innovations until the Yankee boat of to-day presents the appearance of a happy mean between the broad and shallow boat of earlier years and the deep cutter, that continues to be the favorite vessel with English yachtsmen.

Moderate beam and increased depth seem to be the present tendency of the American yacht. In minor details, however, the results of study and a thorough investigation of the principles and forces at work are not less apparent. In ballasting, scrap-iron and paving-stones have been replaced by lead and iron keels, while inside ballast is cast in forms designed especially to fit the frames. The center of gravity is thus lowered, which enables the boat to carry with safety a much larger spread of canvas than before. For standing rigging, wire is used in place of

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rope, giving increased stability and strength to the masts, and calculated to meet the strains incident to greater pressure. Even the canvas for first class yachts is now a special manufacture, being lighter and made in narrower strips than that formerly used.

The Eastern Yacht Club, one of the most important to-day, was not organized until 1870. The Dorchester and Manchester came into existence the same year; the "Seawanhaka" and "New Jersey" clubs followed in 1871, and since that period yacht clubs have multiplied to an enormous extent in the Eastern waters, besides a number on the Pacific coast and Northern lakes. Philadelphia, Baltimore, Charleston, Savannah, Saint Augustine, Mobile, and New Orleans are all well represented on the yachting list.

As late as 1873 the Boston Club had only 13 schooners, 25 sloops, and 2 steamers; the "Eastern" had 32 schooners and 13 sloops; the South Boston, 4 schooners and 17 sloops; the Lynn, 1 schooner, 23 sloops, and 8 cat-rigged boats, the Beverly had 37 sloops and small boats; and the Bunker Hill 5 schooners, 13, sloops and 1 steamer. Around New York there had come into existence; the "Brooklyn," "Atlantic," "Seawanhaka," "Jersey City," "Williamsburg," "Harlem," "Long Island," "Bayonne," "Columbia," and "Pavonia" clubs, besides a half dozen minor organizations.

By 1877 the Eastern States had made immense advances, the total number of clubs in that year being 53, of which number 12 were located in New England. In the vicinity of New York there were 23; on the lakes, 8; and 10 in Southern waters, comprising in all about 800 owners.

Among the New England clubs the "Eastern" was in the lead, with 29 schooners and several steam yachts, and an aggregate membership of 250. Next in importance came the "Boston," with 14 schooners and 61 sloops, while the South Boston Club had 31 boats and 150 members. The East Boston Club had 25, while in the extreme East we find in this year the Portland Club, with 25 boats and 150 enrolled names; the Beverly claimed 100 members and 54 yachts; the "Bunker Hill," 125 yachts; and the New Bedford Yacht Club, which came into existence that year, has become one of the most prosperous in the country. These, with the Lynn, the Haverhill, the Quincy, and a number of others along the Eastern seaboard have kept the sailmakers busy.

Among the clubs the spirit of emulation has been strong. Large regattas have been held annually in numbers, at which the best craft of different clubs have met each other in generous rivalry. Lectures on the designing and construction of yachts have received the attention and encouragement of yachtsmen during those periods of the year when sailing was impracticable. It is only natural that under such circumstances. investigation and discussion should lead to a variety of views as to what particular form represented all that was best in model or rig. This question as regards model has divided the enthusiasts and theorists among yachting men into two schools, the respective advocates of the cutter and sloop. The strong adherence to the former type in English waters had doubtless the effect of establishing a strong precedent in favor of this class, and for some years the war of opinion waged strong between the advocates of each until every imaginable extreme has been submitted to at least a fair trial, and it may be fairly said that neither extreme of draft or breadth of beam has prevailed to the entire exclusion of the other. The resultant yacht seems to be after all a judicious combination of the best features of both. Out of all the discussion, trial, experiment, and use the fact seems at all events to have become established beyond dispute that the center-board craft, either moderate or extreme in breadth, is, notwithstanding all that has been said to the contrary, a good sea-

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going boat, and the old idea identifying the so-called American "skimming dish" with a death-trap is exploded; numerous trips across the Atlantic and a number around the Horn to the Pacific coast of the United States having placed the seaworthiness of a properly constructed center-board vessel beyond question.

Perhaps nothing in the annals of yachting has done so much to delay a recognition of the center-board boat as a safe one to go to sea in as the unfortunate and almost phenomenal accident that happened to the Mohawk, a large schooner center-board yacht, one of the largest of her type ever built, and now quite generally believed to have been one of the stanchest. The capsizing of this large vessel, with consequent loss of life, threw a cloud over the merits of the center-board type of yacht that only time and further experiment could dispel, notwithstanding the fact that she capsized under circumstances which would probably have had the same effect on any vessel that was then built. In a light wind, all sail was set, even to the large club topsail, and the sheets lashed down—all this before the anchor had broken ground—a sudden and violent squall struck the vessel in this predicament and threw her on her beam ends. It has taken ten years to remove the prejudice this accident induced in the minds of those who advocated the cutter model.

The evolution of the American yacht, however, has gone steadily on, and its tendency has mainly been to modify the lines, the midship section, and the rig, irrespective of the question of center-board or keel. Experience has shown that neither the idea that a boat could fly over the water easier than through it, nor the converse of this, was entirely true to the exclusion of the other. Models have become modified in both directions. It has also shown, of late years, that a given-sized craft will develop greater speed rigged as a sloop than as a schooner, and while the schooner will always remain the handier seagoing rig, by virtue of its smaller sails and lighter spars, we can hardly doubt that the racing machine of the future will continue to be a "single-sticker."

The international races of this year and the last seem to have almost entirely done away with the question of cutter or sloop, as it is fair under the circumstances to presume that any one of the four large sloops would have defeated the Galatea, as did the one selected for that purpose. We can scarcely expect, however, that this will have any effect on the English idea of yacht-designing, the old argument remaining as strong as ever that their style of boat is better adapted to the rough English waters. But the shallow craft took the Queen's cup from them in their own waters, and there seems no immediate prospect that they will ever get it back or see another opportunity to race for it at home.

This international trophy of the prowess of American yachtsmen has become the object of a highly meritorious and generous rivalry between the two nations that have held it, and has proved itself a large factor in the science of yacht sailing and construction. This is perhaps well evidenced by the fact that the American would stand little chance to win this cup to-day from the sloops that have recently come after it.

This cup was originally offered as a prize to be sailed for by yachts of all nations, without regard to difference of tonnage, going around the Isle of Wight (the usual course for the annual regatta of the Royal Yacht Squadron), and was won by the schooner-yacht America, beating eight cutters and seven schooner-yachts which started in the race. The owners of the America placed this trophy in the hands of the New York Yacht Club, to remain as a perpetual international cup, open to com-

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petitors from all nations, subject only to certain liberal conditions, the only important one of which is that the cup shall always be sailed for over the regular course of the club holding it, the result of which is that it will in the future be sailed for in American waters until the English

FIG. 1. The Queen's Cup.

yachts beat ours on our own ground. The cup is of solid silver, it weighs 100 ounces, and cost 100 guineas, and on its outface is engraved the names of the winning yachts and their builders.

These international contests have established beyond a reasonable doubt the supremacy of the American type of sailing yacht. They have fairly settled the long-disputed question of cutter and sloop, and

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they have not only shown the superior speed of the single-mast craft, but they have resulted in the construction of four sloop-yachts of unprecedented dimensions—the finest boats in the world of their kind, and absolutely without rival in point of speed—the Puritan and Pris-

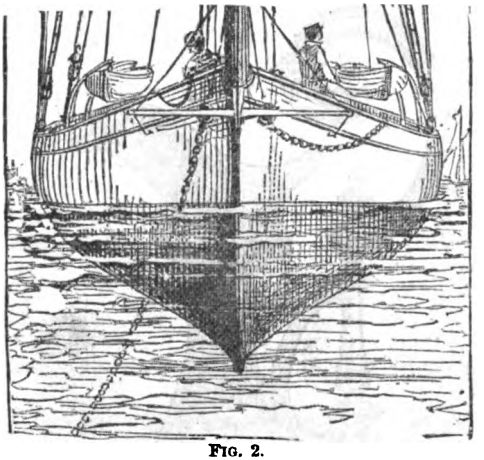

FIG. 2.

cilla, built to meet the Genesta in 1885, and the Mayflower and Atlantic, constructed, in addition to the other two, to meet the Galatea in 1886. These four boats represent the culmination of yachting science to-day, and it is not probable that they will soon be surpassed. They are all four characteristic American yachts, exponents of that particu-

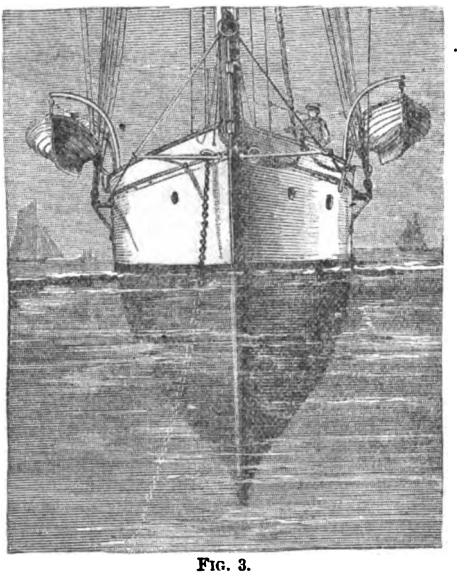

FIG. 3.

lar type of boat which alone are the result of American yacht designing and yacht sailing in American waters since 1840. The Mayflower, the last built, has proved herself, so far at least, the superior yacht of the four. They are all closely allied in every particular, and telling the

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difference between any two of them is much like splitting a hair twixt north and northwest side.

Fig. 2 shows a cross-section of the Mayflower or midship section as viewed from the bow, and Fig. 3 is the same view of her competitor, the Galatea; and although the Mayflower is considerably narrower, in proportion to her length, than American yachts of ten years ago, they are to-day both extremes of their own respective types, and illustrate well the marked difference between cutter and sloop.

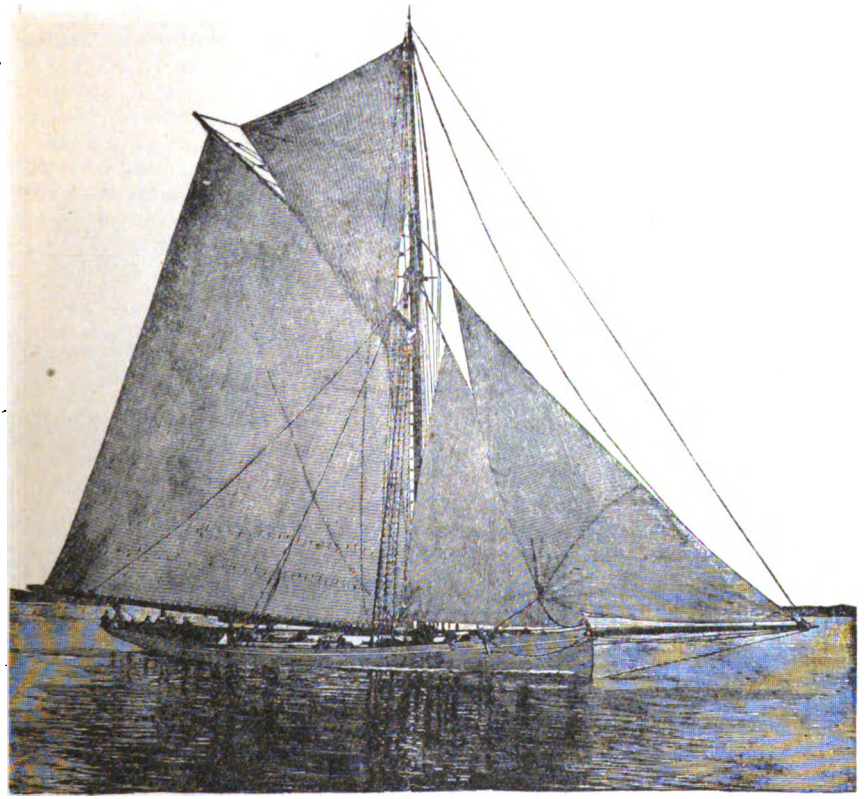

FIG. 4.—American sloop yacht Mayflower.

The two vessels are nearly of the same length, the Mayflower being 2 feet shorter, but in breadth of beam their difference of construction is far more noticeable; being wider, the Mayflower carries more sail, and on this account was handicapped, being obliged to allow the Galatea 38 seconds over the inside course. The Galatea's lines show the conventional cutter having a strongly rocking or curved keel, enabling her to go about very rapidly, and she actually proved herself quicker in stays than the Mayflower.

The Genesta and Puritan, which competed in 1885, were similar in every way to these two vessels, with the single exception of being both a little smaller.

According to her displacement, the Galatea would seem to be nearly 50 per cent. larger than the Mayflower, and she carries in fact nearly twice as much ballast, and appears in every respect quite as well calculated for speed as her rival, and the only explanation it seems possi-

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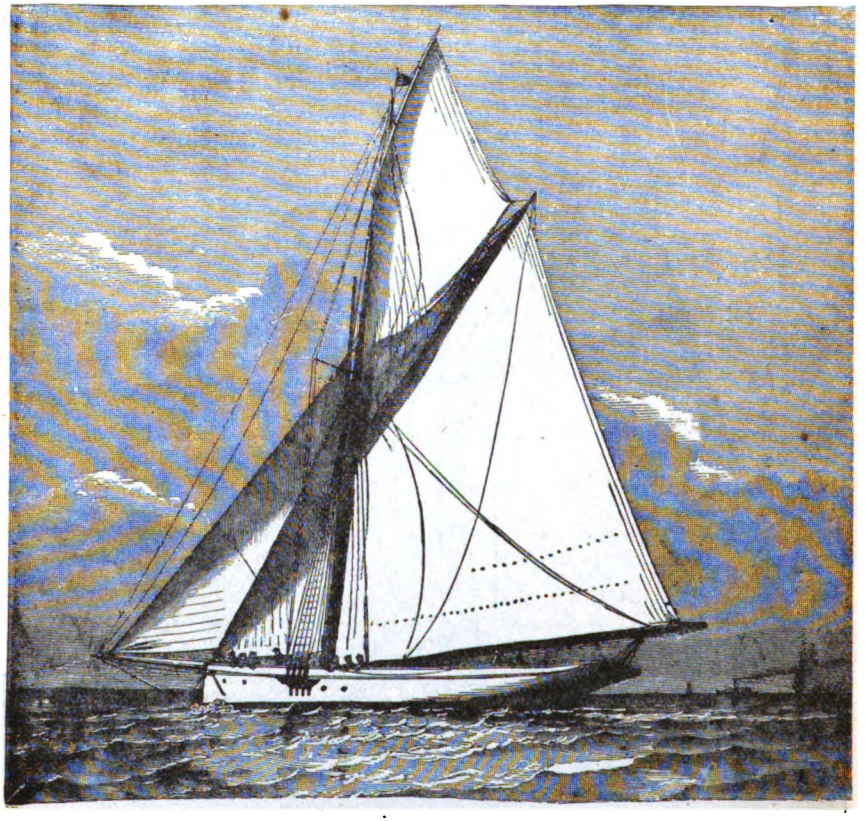
ble to offer why the American type of model should win, is her greater beam, which enables her to stand up to the wind better, and use more of the actual wind power for driving. From a purely theoretical standpoint, however, it is easy to show that this result is to be expected, and that the sloop of similar dimensions has decidedly the advantage of the cutter.



British cutter yacht Galatea.

The Galatea is built of steel, and was modeled by Mr. J. Beaver Webb, of Kinsale County Cork, Ireland, and the Mayflower by Mr. Edward Burgess, of Boston, Mass. In the first race, of 38 miles, the Mayflower won by 12 minutes, 2 seconds, corrected time, and the second race, 20 miles out to sea and return, was won by the same boat by half an hour less a few seconds.

The comparative dimensions of the two yachts and their spars are as follows:

Dimensions.	Galatea.	Mayflower.	Dimensions	Galatea.	Mayflower
Length over all.....feet..	102½	100	Main gaff.....feet..	45	50
Length on load water-line.....feet..	87	85 7/12	Spinnaker boom .....do..	65 1/12	74
Extreme beam .....do ..	15	23 1/12	Area of sail, per New York Yacht Club rule, square feet	7,146	9,000
Depth of hold.....do...	12½	8½	Tonnage, old measurement.....ton..	171 11/94	171 7/94
Draught of water .....do...	13 1/12	9	Displacement .....do...	157 83/100	110
Length of mast .....do...	79	88	Ballast.....do...	81½	48
Length of topmast....do...	47	46	Amount on keel.....do...	81½	42
Bowsprit outboard....do...	36 1/12	38			
Main boom.....do...	78	80			

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I should not close this mention of the year's great race without reference to the magnificent sloop-yacht Atlantic, built simultaneously with the Mayflower by the Atlantic Club of Brooklyn. She was designed by Mr. Philip Ellsworth, and constructed by Mr. John Mumm. She is 95 feet over all, and 84 feet on the low-water line; her extreme breadth is 23 feet 2 inches, and depth of hold 12 feet 3 inches, with 9 feet 3 inches draught of water when the center-board is up. This boat differs in several respects from the other large sloops, having her greatest breadth of beam farther aft than any of the others, thus making the Atlantic's low bow about 68 per cent. of her entire load-line length; this factor being 60 per cent. in the Priscilla and only 58 per cent. in the Puritan. This feature is, however, somewhat compensated in the Atlantic by a corresponding increase of the deadflat section.

Assuming that the bows of all these boats are sharp and as long as they can be made, being of nearly equal length, their relative sharpness will be inversely as their deadflat sections in area. The following table gives the relative dimensions of the four great sloops:

Dimensions.	Puritan.	Priscilla.	Mayflower.	Atlantic.
Length over all ..... feet..	95.0	95.0	100.0	95.1
Length on load-line ..... do...	81.1	85.0	85.0	84.0
Breadth, extreme ..... do...	22.7	25.5	23.5	23.2
Draught of water ..... do...	8.2	8.0	9.6	9.3
Mid-section area ..... do...	82.0	86.5	82.0	102.0
Keel ballast ..... tons..	27.0	.....	37.0	35.0
Inner ballast ..... do...	13.0	45.0	11.0	25.0
Displacement ..... do...	102.5	114.0	110.0	126.0
Area of sail ..... feet..	7,370.0	7,881.0	.....	8,012.0

The Atlantic differs from the Mayflower mainly in relative displacement, area of deadflat section, and ballast, being greater in the Atlantic.

The comparative dimensions of the Puritan and Genesta, the international racers of 1885, are given in the following table:

Dimensions.	Puritan.	Genesta.	Dimensions.	Puritan.	Genesta.
Length over all ..... feet..	93	96 1/2	Mast, deck to hounds .. feet..	60	52
Length on water-line ... do...	81 1/2	81 1/2	Mast, heel to cap ..... do...	78	77 1/2
Extreme beam ..... do...	22 7/12	15	Mast, diameter in partners, inches	18	17
Extreme draught ..... do...	8 1/12	13 1/2	Topmast, fid to sheave. feet..	44	44 1/2
Depth of hold ..... do...	.....	11 1/2	Bowsprit, outboard .... do...	38	36 1/2
Displacement ..... tons..	105	150	Boom, length ..... do...	76	70
Ballast on keel ..... do...	27	70	Boom, diameter .... inches..	14	.....
Ballast inside ..... do...	20	2	Gaff ..... feet..	47	46
Ballast, total ..... do...	47	72	Spinnaker boom ..... do...	62	64
Rates of ballast to displacement	.45	.48	Sail area, by rule ..... do...	7,982	7,387
Tonnage, Yacht Racing Association rule ..... tons..	140	80	Topmast block to deck .. do...	102 1/2	97 1/2
Racing length, New York Yacht Club rule ..... feet..	83 1/10	83 1/10	Bowsprit to boom end ... do..	144 7/12	140 1/2

The result of the great race between these two were as follows:

	First race.	Second race.
	h. m. s.	h. m. s.
Puritan	6 06 05	5 03 14
Genesta	6 22 52	5 15 23
Puritan beat Genesta	16 47	12 09

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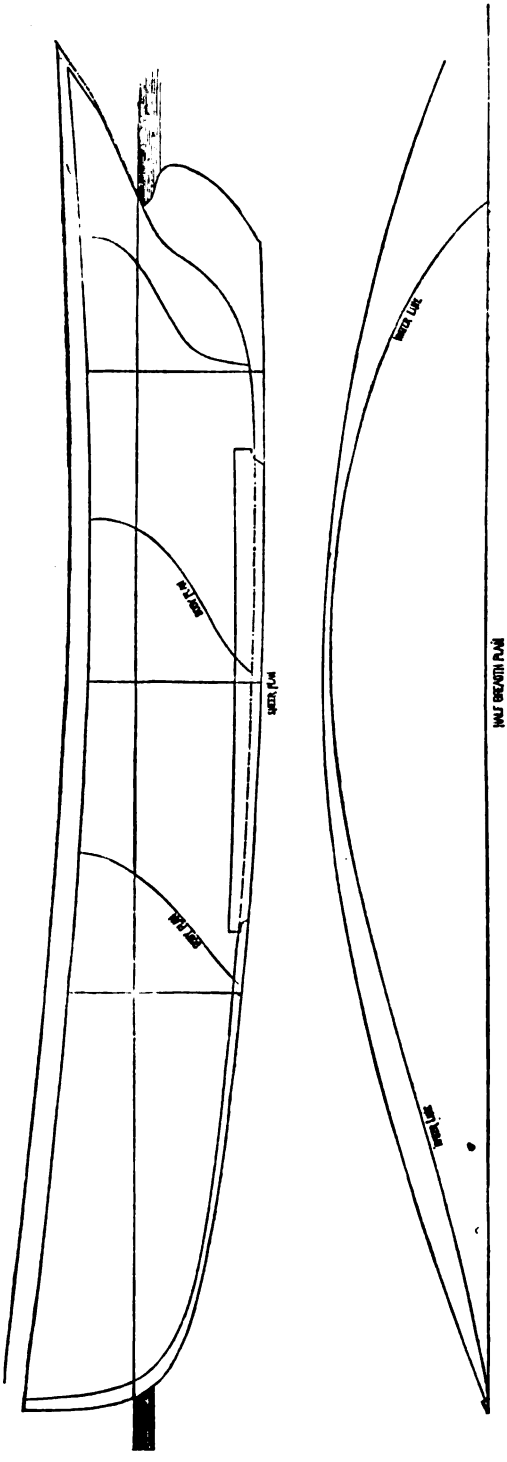

FIG. 5.—Sheer and half-breadth plans of American sloop Atlantic.

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It will be observed, however, that, although no third race was required to settle the contest of either 1885 or 1886, the difference that gave the race to the Puritan in 1885 was not sufficient to establish any very definite superiority of the sloop over the cutter in this particular instance. It is evident, however, that the Americans are neither standing still nor going backward.

In conclusion, it may be well to give for the theorists some expression of the mathematical principles that lie at the foundation, respectively, of the cutter and sloop.

The question of the relative stability of two yachts is said to consist in the determination of the resultant or ultimate action of all the forces at work, internal and external, under the same circumstances for each. The question involves also in a measure the determination of how, under given circumstances, the action of any external force, as the wind, may be best met and resisted, or used, by the combined action of the known interior forces at work.

The external force will, of course, have to be assumed. It is necessarily the resultant of several, each of which depends for its direction and intensity upon a variety of data, which can only be approximated in value.

To explain the action of these forces, let Fig. 6 represent the cross-section of a yacht in which A B C is the immersed portion of the midship section when at rest on an even keel. Let the center of gravity of the entire vessel be at G in the section taken. Let the center of volume of the submerged portion in the inclined position indicated be at H, which point is the center of buoyancy and the center of gravity of the displaced water. It is the point through which in the position assumed the upward thrust or resistance of the water acts. This point, of course, may or may not be in the cross-section taken containing G, but it may be there, and it will simplify the discussion, without in any way affecting the results, to assume such a position of the yacht as would bring G and H into the same midship section.

Now, it is apparent that when the yacht is careened, as shown in the figure, its entire weight still acts downward through G, while the resistance opposed by the displaced water acts vertically upward through H. These two forces produce a tendency to rotation as a result of their combined and simultaneous action, one pulling down through G, the other pushing up at H, and both acting on the rigid form of the boat. The effect of the two, since they are equal in intensity, is to produce a tendency to rotation about a point midway between them, and by which the vessel seeks to regain a position of equilibrium on an even keel, and manifestly requires the action of a third or exterior force to hold it in the inclined or careened position.

From a simple principle of mechanics we know that this tendency in the boat to return to the vertical position is measured by what is known as the "*moment of rotation of the couple*," which is equal to the product obtained by multiplying either force of the couple by the perpendicular distance between them.

Considering the vessel free in the water, it can be shown that for slight changes of position, such as arise in practice, the vessel will careen by turning about its center of gravity, G, which will always retain its position with reference to the plane of flotation unchanged.

The tendency to return to the vertical from the careened position may therefore be put in a somewhat simpler form for our use; for, in view of the principle first stated, the moment of the couple becomes equal to the product of the force acting upward through H, which is the dis-

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placement, or, what is the same thing, the entire weight of the vessel (so many tons or pounds) multiplied by the *horizontal* distance between G and H; or, in other words, the tendency to return is measured by the force acting upward through H and with *a lever-arm* equal to the horizontal distance from G to H, indicated in the figure by the line G *h*. Now, the force acting downward through G may be neglected.

The question of stability consists in determining the value of this force acting with the various lengths of "lever-arm" that may arise, and ascertaining for given lengths how great an external careening force in the form of wind acting abeam it is calculated to resist.

The line GP, through the center of gravity of the vessel, and which is vertical when the vessel is at rest on an even keel, is called "*a line of rest;*" it is the line along which the weight of the vessel and the upward thrust of the displaced water act in opposite directions, and hold each other in equilibrium when the vessel is in that position (vertical) and subject to no external force. The moment the vessel careens, the "center of buoyancy," H, through which the buoyant effect of the water acts, moves out of this vertical line to the right or left; the two forces no longer oppose each other directly in the same straight line, but their points of application become separated, while their directions remain parallel, and a "couple" results. This *new* vertical through H, along which the buoyant effect acts, is called "*a line of support,*" because it is the line along which the water supports the weight of the vessel partly submerged in it.

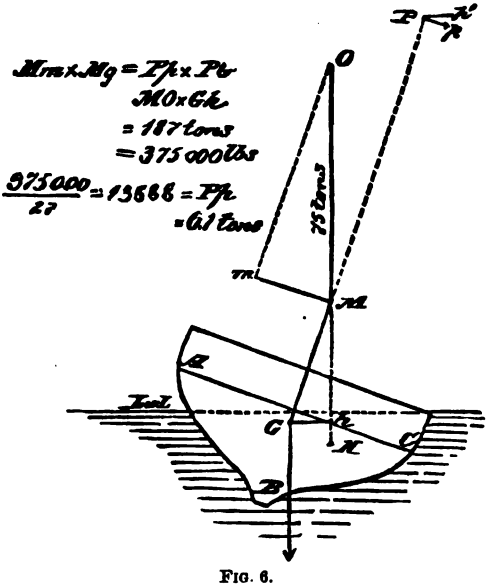

FIG. 6.

As the point H is the point at which the buoyant effort of the water acts, it must be the center of volume (or bulk) of the displaced water; and the position of this point depends evidently upon the shape and configuration of the submerged portion of the vessel, and it is clear that as the vessel whose cross-section is given in the figure careens more and more to the right, it submerges more and more of its hull to the right of the line of rest (or plane of symmetry), GP, and takes more and

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more of its bulk out of the water to the left of that line (or plane). It is therefore apparent that the center of volume of the submerged part, or the point H, must travel more and more to the right as the vessel careens, and thus increase the distance G*h* as the vessel continues to turn over. Now the point M, in which the line of support HM cuts the line of rest PG, is called the "metacenter" of the vessel. Its position in the vessel is important, for it will be seen from an inspection of the figure that the vessel cannot capsize, but will have a tendency to return to the upright position so long as the metacenter is above the point G, the center of gravity.

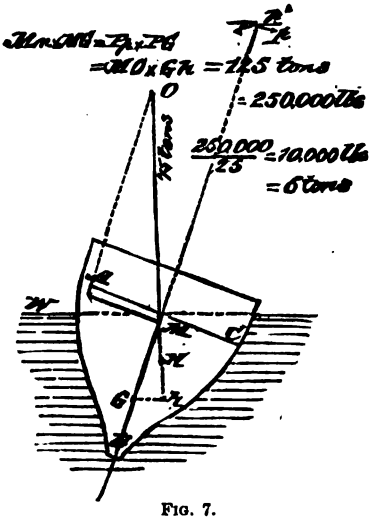

FIG. 7.

This results from the fact that the metacenter M may be regarded as the point through which the upward thrust of the diplaced water (acting first through H) is brought to bear upon the line GP where the careening force is applied (say at P). In other words, GM may be regarded as the lever-arm with which the buoyant effort seeks to right the vessel, acting through M at right angles to GP, and with the intensity M*m*; that component of the "buoyant effort" which acts at right angles to GP and in opposition to the careening force at P indicated by P*p*. It is therefore evident that the higher M, the metacenter, is above G, the greater will be the lever-arm MG, and the greater the advantage with which the buoyant effort seeks to right the vessel. It is for this reason that the height M of the metacenter above the load-water plane (or plane of flotation) is considered an important factor in yacht construction.

Let us now suppose the action of a third or external force brought to bear at some point, as P, on the line of rest, and acting in the direction P*p'* (horizontal), and whose tendency is exerted to careen the boat to the right.

Under its action the boat will turn about the point G, its center of gravity, and it is evident, from a consideration of the figure, that this external force, whose intensity is indicated by the length of the line P*p'*, acts with its entire value to careen the boat only when the line of rest GP is vertical, for as the vessel careens under the action of this force, its effective component P*p*, perpendicular to PG, becomes constantly smaller in proportion as the careening angle PGR increases; and at the same time, while the actual careening force P*p*, the perpendicular component of P*p'*, is becoming less and less as the vessel careens, the point H is going farther and farther from G; the metacenter M farther and farther up the line of rest P*b'*, thus increasing the lever-arm of the buoyant effort, and at the same time increasing its effective component, M*m*, which resists P*p*. It is therefore apparent that an angle will soon be reached at which the buoyant effort, acting upward through H and transmitted to M (and there, we will say, acting at right angles to PG in the direction M*m*), will hold the careening force acting through P in the direction P*p* in equilibrium, and the boat will come to rest in an

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inclined position of equilibrium, and cease to careen. This position will be readily recognized by those familiar with sailing.

The graphical construction of these forces is simple, and will perhaps add clearness to the demonstration.

Prolong HM to O, assume a scale of equal parts in which a unit of length shall represent a given number of units of force, say five tons to the quarter inch (or any convenient scale), make MO equal to the upward thrust through H so many tons. Resolve MO into its components by means of the parallelogram of forces acting in the direction GP and at right angles to that line. M*m* will be this component; so many tons or pounds acting in the direction M*m* through the point M with the lever-arm MG and urging the boat to the left about the point G.

The force P*p'*, acting at P, is the force of the wind on the entire sail area, so many pounds per square foot (depending on the velocity of the wind) for so many square feet. This entire force is laid off on P*p'* with the same scale of equal parts indicating so much force to the unit of length. P*p'* is then resolved in like manner into its components acting along GP and at right angles to it. P*p* is the remaining effective component of P*p'* that acts at P to turn the boat about G to the right, in opposition to M*m* acting at M to the left. The greater force has necessarily the shorter lever-arm, the lesser the force the longer; both have the point G as a center of action. From the expressed conditions we must therefore have:

$$Pp \times PG = Mm \times MG. \qquad \text{(Eq. 1.)}$$

In a position of equilibrium the two rectangles having M*m* and MG and P*p* and PG for sides respectively *must be equal in area*, which is the geometrical interpretation of the equation of condition.

Having thus briefly determined the new conditions of equilibrium under the action of a single given external careening force, or a number of such forces having a single resultant, we find its moment of rotation or tendency to capsize the boat counteracted and resisted by a moment of rotation in the opposite direction, produced by the buoyant effort of the water acting upward through H, and we conclude from the preceding that the careened position of equilibrium will be soonest reached by making the first number of equation 1 small, *i. e.*, the product $Pp \times PG$; but P*p* depends for its value upon the effect of the wind, manifestly beyond our control, while PG represents the distance of the center of effort of the entire sail area (where the wind acts) above the center of gravity of the vessel, but the position of this point P is fixed by the shape of the sails. It therefore seems that instead of making the first member of equation 1 small, we must seek to make the second member relatively large; we must try to make it so large that, for a given value of PG, P*p* may have any possible value, without incurring the danger of their product exceeding the product of $Mm \times MG$. We have therefore to ascertain how the force acting upward through H may give the greatest possible product of lever-arm MG multiplied by the intensity M*m*.

It is clear, from an inspection of the figure, that this product depends, first, upon the upward thrust through H, which must remain constant in intensity, being equal, as we have seen, to the weight of the vessel; and, secondly, upon the lever-arm MG, with which it acts; in other words, the only way in which we can effect the value of the product which constitutes the second member of our equation, to increase it, is to increase

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the lever-arm MG, or increase the distance of the "metacenter M" above the center of gravity G. But it is evident that this may be accomplished in two ways, viz, we may either lower the position of the point G on the line PG, which means simply to make the center of gravity of the vessel very low and deep by using a lead keel or much ballast, or we may move the point M higher up by causing the point H to move rapidly to the right of G as the vessel careens, which in turn means to give the vessel a broad and shallow cross-section, so that the "center of buoyancy" in the careened position will be very far to the right of G, thus causing the line of support HM to cut the line of rest PG at a point high up above G. The latter method amounts virtually to increasing the line G*h*, which is the horizontal distance between the two centers, and it is evident this may be effected either by lowering the position of G on the line PG, or by carrying H to the right. Either way will answer, so far as the theory of the matter goes. Both are used in practice with good results, as we shall see.

It is clear that by making the cross-section of the vessel narrow and deep, and hanging a lead keel on the bottom, we are in fact bringing G to its lowest possible point below the load-water plane, and are using the first of these methods. But if, on the other hand, we leave the position of the center of gravity, G, out of consideration, and make the cross-section of the boat, ABCD, broad and shallow, the point H will move rapidly to the right as such a vessel careens, and thus rapidly extend the line G*h* to the right of G and raise the point M on the line PG, thus increasing the lever-arm of the force M*m*.

These two methods of increasing the factor MG in equation 1 give us at once the principles of mechanics that underlie the deep and narrow cutter on the one hand and the broad and shallow sloop on the other. Thus are we brought in theory by analytical investigation of the forces at work to the same identical issue that the mechanic has brought our practical knowledge of yachts through years of experiment.

The analytical deduction shows clearly that we may elect either of these two methods to produce the desired result.

Bearing in mind the action of the different forces considered, we may proceed further to investigate the relative advantages the two methods present under given conditions in practice.

The first, with low center of gravity and narrow beam, is the usual model of the English cutter; the latter that of the American sloop. It will be seen that they differ essentially in principle, and, as might well be expected, each has both advantages and faults peculiar to its class.

Fig. 6 is a fair representative of the American sloop in cross-section, while Fig. 7 represents the cutter type. In order to make our consideration of these two forms as conformable to practice as possible, the two figures with the necessary construction are drawn to scale, and represent the corresponding elements of two boats having the same load-water line length, same displacement, and the same sail area nearly. The principal remaining elements are given below:

	Sloop.	Cutter.		Sloop.	Cutter.
Length, L. W. L .....feet..	65	65	Mast (deck to hounds) .feet..	41	42
Beam (extreme) .....do...	15	11½	Main boom.....do...	52	58
Draft .....do...	9	12	Gaff .....do...	35	39
Lead on keel .....tons..	3	38½	Bowsprit outward .... do...	27½	30
Lead inside .....do...	33	1½	Area lower sails. square feet..	3,000	3,450
Ballast, total.....do...	36	40	Custom-house bulk ...tons..	44	40
Displacement.....do...	75	75			

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The center of effort of the sail area in each (lower sails only) would be about 25 feet from the deck, *i. e.*, the point P at which the wind acts in both. The displacement of both boats is 75 tons, or 150,000 pounds; this is the measure of the upward thrust or buoyant effort of the water

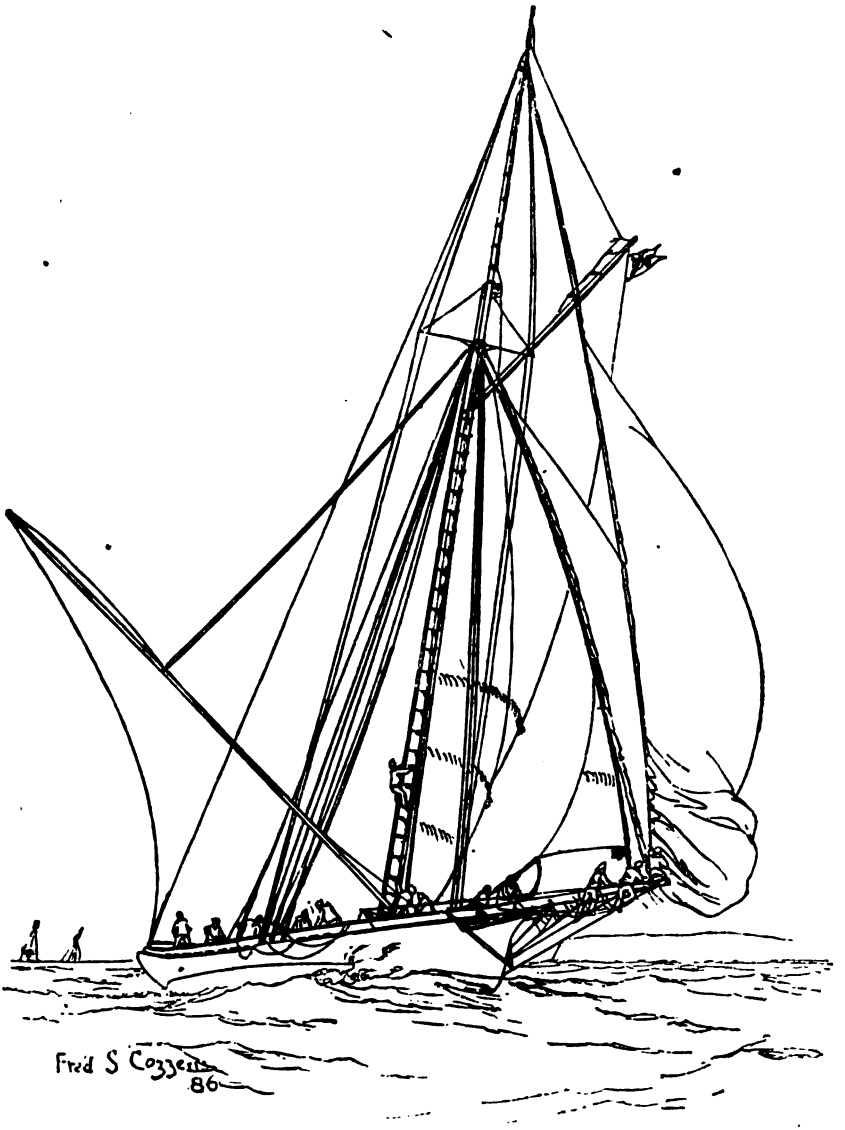

FIG. 8.—Type of sloop yacht under sail.

in each. Let us suppose them both careened to the same angle, as indicated in the figures, and ascertain the corresponding resistance afforded in each to a careening force acting through the point P to the right. The submerged portion in each cross-section now becomes *aCb*, but it will be readily seen that in this position the excess of the sub-

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merged portion of the boat on the leeward side of the line of rest GP over that to windward is far greater in the sloop (Fig. 6) than in the cutter (Fig. 7), and that the center of volume of the submerged part (H) in the sloop is necessarily on this account much further removed to the right of G than in the cutter. To offset this, however, the position of the point G in the cutter (the center of gravity of the entire mass is considerably lower down along the "line of rest" GP than in the sloop, owing somewhat to the shape, but mainly to the lead keel the former carries, and this in a measure compensates for the slight movement of the point H (the cutter of buoyancy) to the right in the case of the cutter.

As G represents very closely the position of the center of gravity in each case, so H also represents with but slight error the corresponding position of the center of buoyancy in the two types when both are careened to the same angle. It will be observed, however, that the distance Gh is considerably greater in the case of the sloop, and that the position of the meta-center M is consequently much higher. In the careened position chosen we have in each case 75 tons, equal to 150,000 pounds. The buoyant effort or displacement of both boats multiplied by the corresponding distance Gh=2.5 for one and 1.66 in the other, which for the sloop gives

$$150{,}000 \times 2\tfrac{1}{2} = 187 \text{ tons},$$

and for the cutter

$$150{,}000 \times 1\tfrac{2}{3} = 125 \text{ tons}$$

for the measure of the cones pending "moments of rotation," in each due to the upward thrust of the buoyant efforts acting along the lines of support Hm, and tending to right the vessel by turning them to the left about the point G in each.

The distance GP in the cutter will be, say, 25 feet, and in the sloop 27 feet, the cutter having a low and long sail plan.

The center of effort being in each at the point P, and dividing the respective moments of rotation by the distance GP, the "lever-arm," with which the careening force acts in the two models, we get for sloops

$$375{,}000 \div 27 = 13{,}888 \text{ pounds} = 6\tfrac{8}{9} \text{ tons}$$

for cutter

$$250{,}000 \div 25 = 10{,}000 \text{ pounds} = 5 \text{ tons},$$

which represent in each case the resistances opposed at the point P to the careening effort when both boats lie over at the same angle.

Let us suppose the sail areas in each case, or means of receiving the careening force as P equal, or, say 3,000 square feet in both, we obtain as a result of this supposition $4\frac{1}{2}$ pounds per square foot of sail exposed in the sloop, and only $3\frac{1}{3}$ pounds in the case of the cutter to careen both boats over to the same angle; but as these forces are presumed here to act perpendicular to the sail areas, the actual force of the wind to accomplish this result would in practice be considerably greater. Making them a suitable allowance for the inclination pPp as well as the inclination of the sails to the fore and aft line of the vessel these pressures would correspond to wind velocities of about 30 and 35 miles per hour, respectively, being in the proportion of 6 to 7 per cutter and sloop.

We therefore see that for a given careening angle the sloop presents more resistance to the wind in drawing forward than the cutter, or, what is the same thing, in a given amount of wind the cutter will careen more

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than the sloop. Or, in common parlance, the latter is the stiffer boat, and other conditions being equal she will stand up to the wind better; but not only this, it follows from the same reasoning that as the wind

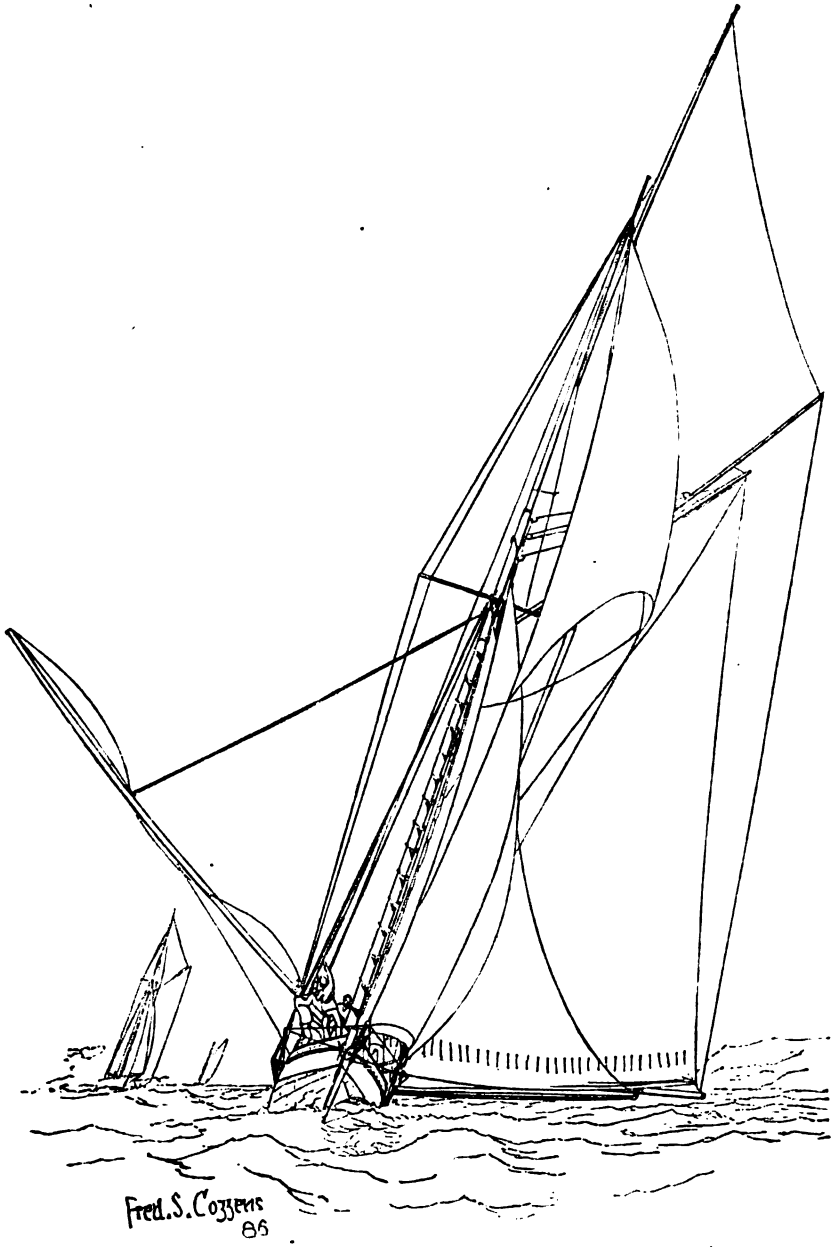

FIG. 9.—Type of the cutter yacht under sail.

force acting at P to drive the boat has its effective component P*p* diminished rapidly as the boat careens, since the component of this force perpendicular to the sail only, is available for this purpose. In stand-

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ing up to the wind therefore the sloop is enabled to use a greater portion of the entire actual force of the wind than the cutter which careens farther for a given amount. The sloop has therefore more driving power for a given spread of canvas, and the cutter must carry more sail in order to derive the same amount of propelling force from a given velocity of wind.

At the same time, and for the same reasons, the cutter will doubtless stand a heavier blow with less danger of disastrous results than the sloop. For considerations of speed, however, in wind against which both can stand up under full sail, the mechanics of the problem seem to be decidedly in favor of the sloop, whose broad beam enables her to use and derive more actual driving power from a given velocity of wind, the cutter being hove down considerably in a moderate wind loses much of its effective force. But the cutter often beats the sloop under given conditions. In its details the problem becomes exceedingly intricate, and the conditions involved in the ordinary case are usually so complex as to baffle any attempt at rigid mathematical investigation. We cannot hope to explain the matter on purely demonstrable grounds, but the results of practice seem to have fairly maintained the slight difference that the elementary theoretical principles indicate in favor of the sloop, and in the long run has left but little question as to their relative merits under the same conditions for both, at least so far as speed is concerned. Ever since yachts have sailed the question has always been an open one, and both sides have strong advocates, mainly because the conditions under which the two types have been developed seem to require the advantages peculiar to each.

The sloop model has indeed great stability, but she is necessarily a quick, "jerky" boat; the metacenter rises and falls rapidly as the boat careens a little more, and then again returns to her former position; she rights herself suddenly at the least slackening of the wind, and is comparatively ill-adapted to a heavy or short sea. The cutter, on the other hand, owing to the slight degree of change that the center of buoyancy undergoes in moving from one careening angle to another, is necessarily a much easier sea-going boat. She goes over almost onto her beam ends with perfect safety, and returns easily and gradually as soon as the squall slackens or the vessel heads into the wind. It would therefore seem natural that the cutter should remain the preferred yacht of the English, owing mainly to the waters in which they sail, while with us the center-board type, more or less modified, will find preference for our smooth waters, bays, and estuaries, where our yachting is mainly conducted. The question can never be definitely settled for all cases. Each type has merits that adapt it to those situations where it is usually found. Viewed, however, in the light of mere racing-machines, the question changes somewhat, as the issue is one of speed alone under like conditions for both, and from this standpoint there seems to be much in favor of the sloop, which advantage she will be likely to hold until some new or improved mode of construction is discovered.

SHIPPING OF FOREIGN COUNTRIES.

As heretofore, I present the tonnage tables of foreign countries, showing the growth and development of the various mercantile navies of the world.

It must be borne in mind, however, that the tonnage which is taken from different statistical tables of the various countries does not in all cases represent the same value, and although attempts have been made

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to unify and bring together the different systems of admeasurement, &c., there have been many obstacles in the way of an accurate determination of the comparative value represented in the tonnage tables.

An international rule for the measurement of vessels of all countries is a recognized want, and in order to bring about a general system of tonnage measurement a number of countries have of late years adopted the rule of the English register ton, which is arrived at by a series of measurements known as the Moorsom system, which was adopted in England by the law of April 11, 1854. The provisions of the same law went into force in the United States on January 1, 1865, and by the act of August 5, 1882, the deduction from the gross tonnage of vessels was provided for as follows:

That from the gross tonnage of every vessel of the United States there shall be deducted the tonnage of the spaces or compartments occupied by or appropriated to the use of the crew of the vessel, but the deduction for crew-space shall not, in any case, exceed 5 per centum of the gross tonnage. And in every such vessel propelled by steam or other power requiring engine-room, there shall also be deducted from the gross tonnage of the vessel the tonnage of the space or spaces actually occupied by or required to be inclosed for the proper working of the boilers and machinery, including the shaft trunk or alley in screw-steamers, with the addition in the case of vessels propelled with paddle-wheels of 50 per centum, and in the case of vessels propelled by screws of 75 per centum of the tonnage of such space, but in no case shall the deductions from the gross tonnage exceed 50 per centum of such tonnage; and the proper deductions from the gross tonnage having been made, the remainder shall be deemed the net or register tonnage of such vessels.

The Moorsom system has been successively adopted by the following countries:

Country.	Date.	Rule.
Denmark	Oct. 1, 1867	Danubian rule of deductions.
Austria and Hungary	Sept. 1, 1871	German.
Germany	Jan. 1, 1873	Do.
Italy	July 1, 1873	Do.
France	July 1, 1873	English or German, as per choice of owners.
Sweden	Apr. 1, 1875	German.
Norway	Apr. 1, 1876	English.
Spain	Jan. 1, 1873	Danube.
Turkey	1875	
Chili	Jan. 1, 1875	German.
Holland	Jan. 1, 1876	Danube or German.
Argentine	Jan. 1, 1877	Danube.
Finland	July 1, 1877	English.
Greece	July 1, 1878	Danube.
Russia	Jan. 1, 1880	German.
Belgium	Dec. 8, 1883	Danube.

It appears that, with the single exception of Portugal, the Moorsom system has become the rule with European nations, and is being gradually accepted in other parts of the world. But the discrepancies which exist in the modes of applying the above rules in some cases show that a uniform method of measurement on what might be termed an international system is far from having been perfectly accomplished.

The Moorsom system, already adopted by so many maritime nations, is said to unite another advantage of importance for purposes of international statistics, namely, it is more accurate than the systems of measurement previously known. But the nations above cited have not all applied the system in precisely the same manner, and although for sailing ships the variations are but slight, existing only in matters of detail, the difference as practiced in the measurement of steamers is considerable. Foreign countries which have adopted the Moorsom system, deduct the tonnage space occupied by the engines and the apartments occupied by the crews, but not all of them in precisely the same manner.

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The following is an abridgment of the different rules adopted by different methods of measurement:

(1) THE ENGLISH RULE.—Deductions to be made from the gross tonnage of steamers according to circumstances and construction. (*a*) Deduction of 32 per cent. of the gross tonnage of screw steamers and of 37 per cent. in paddle steamers; (*b*) deduction of the space occupied by the engine, coal-bunkers not included, multiplied by 1.75 for screw vessels and 1.50 for paddle steamers (the coal-bunkers being presumed to bear a proportion to the engine space of 75 and 50 to 100), as the case may be.

(2) DANUBE RULE.—Deductions same as (*b*) in the English rule, but limited to 50 per cent. of the gross tonnage.

(3) GERMAN RULE.—Deductions of space actually occupied by the engine and the coal-bunkers as ascertained by measurement.

The English rule, so-called, is adopted in Great Britain, in Denmark, and Sweden; the German rule in Germany, Italy, Austria, Hungary, and Norway.

In France the German rule is adopted in principle, although the British rule, under article 13 of the British shipping act of 1854, is almost always practiced.

In Holland ship-owners can elect between the German and Danubian methods, if the steamers have coal-bunkers with fixed bulkheads; but the Danubian rule is applied in vessels which have movable bulkheads.

In Spain the Danubian rule is used, and also for measurement as well as for levying the navigation dues for the Lower Danube and the Suez Canal.

It will be seen that the different modes of application of these different rules makes a variation in the total value of each nation's tonnage.

The English rule (being already the most generally adopted) would be the simplest for general acceptation; but it is said that the Danubian rule is the most accurate, the English system making the boiler space larger than it really is. If the English system were adopted universally it would, it is said, be at the expense of accuracy.

The Danubian rule, though more exact, still makes the boiler spaces too large.

The German rule, under which the volume of space actually taken up by the engines and coal-bunkers with fixed bulkheads is measured and deducted from the gross tonnage, should be accurate. But though correct in theory there are said to be objections to it in practice; as, for example, two steamers, both of the same size, would measure quite differently if one was fitted with coal-bunkers for long voyages and the other was provided only for a short trip. So that it is generally admitted that for a unit of tonnage the register ton by the Moorsom system is the most accurate; and by applying the method known as the German rule for deduction from gross tonnage of steamers the nearest approximation to accuracy is obtained.

But other variations exist in the tonnage tables of different nations, owing to different rules as to dividing spaces and the construction of the vessels themselves.

Moreover, some countries up to a recent date observed their old method of calculating tonnage, which has little or no relation to the actual volume or measure of the vessel. In Portugal the tonnage of ships is still calculated from their measurement of length, beam, and depth. Such system gave to all vessels indiscriminately the same tonnage provided their dimensions were the same. On the contrary, by the Moorsom system the tonnage is ascertained by gauging the general ca-

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pacity of the vessel. In some countries, as Denmark, Norway, Holland, and Russia, they had a system somewhat similar to the Moorsom mode of measurement.

In Norway and Finland special measures were taken to find the volume of displacement between the water-line when light and the water-line when loaded, thus giving the tons weight capacity.

It follows from the great variety of systems of measurement that variations are observed, and that the tonnage of the same vessel measured in different countries would vary accordingly. In order, therefore, to arrive at the actual mean tonnage, it would be necessary to take the mean average of a number of measurements of the same vessel in different countries, or by different methods.

After considerable research and experiment on the subject, the following tables have been prepared, showing how the variation in the deductions and different methods of calculating the tonnage of different nations may be reduced to the same value.

Factors by means of which the tonnage of vessels of different nations is reduced to tons according to the different official decrees cited below.

Country.	Units of tonnage.	Regulations for the assessment of navigation dues at the mouths of the Danube and Suez Canal for the year 1873.	Circular of the Kingdom of Denmark issued by the finance bureau, September 7, 1867.	Imperial decree for the Grand Duchy of Finland, April 2, 1873.	Circular of the minister of marine of Italy, April 1, 1874.	Letter of the chancellor of the German Empire, addressed to the various German states, January 27, 1874.
United States	Register ton	1.00	1.00	1.00	1.00	*0.97 †0.70
Great Britain	do	1.00	1.00	1.00	1.00	.....
France before 1873	Tonneau	0.94	1.00	1.00	1.00	1.00
Germany before 1873	Normal last	1.50	1.50	1.52	1.50	.....
	Lubeck last	1.89	.....	.....	.....	.....
	Hamburg last	1.77	2.38	2.26	.....	2.25–2.77
	Bremen last	1.89	1.54	.....	1.89	.....
Denmark	Commercial last	.....	.....	.....	.....	1.95
Norway	do	2.08	2.08	1.96	2.08	2.08
Sweden	Last	.....	*3.03 †4.00	3.22	.....	3.17
Sweden before 1865	Svar. last	1.98	.....	.....	1.98	1.82
Russia	Last of 2 tons	1.89	1.92	1.48	1.89	1.46
Do	Ton	1.08	.....	.....	1.08	.....
Finland	Svar. last	.....	.....	1.85	.....	1.83
	Last	1.75	1.82	1.83	1.69	1.48
Holland	Ton	1.89	0.95	0.96	0.89	0.75
Belgian	Tonneau	0.95	0.95	0.96	0.95	1.00
Spain	do	1.00	1.00	1.00	1.00	1.00
Portugal	Ton	.....	0.83	0.83	0.88	0.84
Italy before 1873	do	0.94	0.91	0.98	.....	0.97
Austria before 1873	do	0.77	0.82	0.85	.....	0.84
Greece	Tonneau	0.97	1.00	.....	0.97	.....
United Principalities	do	0.97	1.00	.....	0.97	.....
Turkey	Ton	0.76	.....	.....	0.76	.....

*Sail. †Steam.

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Factors by the means of which the tonnage of vessels of different nations may be reduced into tons.

Countries.	Date of measurement.	Units of tonnage.	Mean of the factors of former table for sailing vessels.	Factors for—	
				Sailing ships.	Steaming ships.
Great Britain	Before May 1, 1855	Register ton		0.90	0.90
Do	From May 1, 1855, to December 31, 1867.	do		0.98	1.08
Do	After February 1, 1868	do		1.00	1.12
United States	Before February 1, 1865	do	0.99	0.86	0.67
Do	After February 1, 1865	do	0.99	0.97	0.75
France	Before July 1, 1873	Tonneau	0.99	0.93	1.27
Do	After July 1, 1873	do	0.99	1.00	1.12
Germany	Before January 1, 1873	Last of 4,000	1.50	1.50	1.50
Do	After January 1, 1873	Register ton	1.00	1.00	1.00
Holland	Before January 1, 1876	Tonne	0.89	0.90	0.81
Do	After January 1, 1876	Register ton		1.00	1.05
Denmark	Before October 1, 1867	Commercial last	1.95	1.90	2.22
Do	After October 1, 1867	Register ton		1.00	1.00
Norway	Before April 1, 1876	Commercial last	2.06	2.07	2.25
Do	After April 1, 1876	Register ton		1.00	1.00
Sweden	Before July 1, 1866	Svar last	1.93	1.80	2.70
Do	After July 1, 1866	New last	3.14	3.14	4.70
Do	After April 1, 1875	Register ton		1.00	1.13
Russia		Last	1.73	2.00	2.00
Finland		do	1.84	1.90	1.90
Spain	Before January 1, 1867	Tonelado	1.00	1.05	1.05
Do	After January 1, 1867	Register ton		1.00	1.05
Italy	Before July 1, 1873	Tonelado	0.95	1.00	1.20
Do	After July 1, 1873	Register ton		1.00	1.00
Austria-Hungary	Before September 1, 1871	Tonne			
Do	After September 1, 1871	Register ton			
Greece	Before 1866	Tonneau	0.78		
Do	After 1866	Register ton	1.01	0.93	1.27
Turkey			0.76	1.00	1.02
United Principalities				0.98	
Brazil		Tonelado		0.80	0.80
Venezuela		do		0.70	0.70
Chili		do		1.00	1.00
Peru		do		0.90	0.90

But there is another difficulty in arriving at the relative tonnage of different nations, for the various Government tables do not embrace the vessels of all classes and descriptions. In the United States the documented vessels of 20 tons and above are included in the tables, but there are many yachts and canal-boats that do not appear in the lists of tonnage reported, and are, therefore, not counted in the statistical tables which include:

(1) Registered vessels being those employed chiefly on foreign voyages, and whalers.

(2) Enrolled vessels being coasters and those engaged in lake navigation.

(3) Licensed vessels, or such as are under 20 tons, and sail under a license for fishing and coasting trade.

In Great Britain, according to the merchant shipping act of 1854, all English vessels must be registered excepting:

(1) Vessels under 15 tons employed exclusively on the rivers and along the coasts of the United Kingdom or English possessions where the owners are domiciled.

(2) Vessels are not decked under 30 tons employed exclusively in fishing or coasting on the shores of Newfoundland and islands near the Gulf of St. Lawrence.

In France, on the contrary, the maritime lists include a great many small vessels employed in fishing and coasting business and embraces all vessels above 2 tons, excepting yachts of 10 tons and under.

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In Spain the maritime merchant tonnage embraces all vessels of 50 tons and over, they being considered as suitable for sea navigation. A separate list is given for those of under 50 tons, but fishing vessels and open boats are not included.

In Portugal the shipping lists include vessels of 20 tons and some of smaller tonnage, but fishing vessels are generally included.

In Italy the tonnage tables formerly included a great many vessels, but an effort is being made to eliminate all below 10 tons.

In Austria, and Hungary also, the custom has been to reckon all small craft, the lists embracing some vessels not over 3 tons measurement; and the same may be said in respect to Greece.

In Norway all vessels of 4 tons and upwards are included in the tonnage statements excepting such as are employed on the lakes and fjiords.

In Sweden vessels of 10 tons only are included. In Denmark every vessel of 4 tons is considered as forming a part of the merchant marine, while Russian statistics include vessels down to 20 tons only—10 lasts—but no account is taken of a great number of fishermen and other vessels that navigate the lakes.

In Finland the same rule prevails, vessels of less than 5 lasts, or 9½ tons, being included.

Under the German law of 1873 vessels of 50 cubic meters, or 11 tons steam and 18 tons sail, are considered as part of the merchant marine, but boats employed in river navigation are not included.

In Holland fishing vessels are not included nor in Belgium, where the tonnage tables do not make mention of vessels below 60 tons.

For the sake of uniformity in tonnage statistics it would be well for all maritime nations to adopt the same figure as the minimum, excluding all vessels and boats below the figure settled upon and including all vessels of every description above the tonnage fixed upon in the national lists. Ten tons has been proposed as a convenient figure to fix upon as a proper minimum, but there are many vessels, especially yachts, of a smaller tonnage, which as a matter of convenience it might be well to include, and *four tons measurement* is in consideration of the interests of the smaller vessels which it might be an advantage to include, thought to be a better limit.

Another question of importance in making international comparisons of tonnage is the relative power in transporting cargo, &c., of the sailing ship register ton and of the steamship register ton.

Calculations have been made which go to show that the steam register ton is capable of performing much more work in a given time than the sailing register ton. Some statisticians go so far as to estimate this advantage of the steam tons at three-fold, and even at four-fold, and the estimated power of steamers in consequence of the increased rapidity which they perform voyages has been called the effective tonnage.

In the tonnage tables published in the report of proceedings of the annual meeting of the London Chamber of Shipping, held February 12, 1886, the effective tonnage of steamers is arrived at by multiplying the net register tonnage by three, which raises the effective tonnage of Great Britain for the present year to 22,673,734 tons.

I cannot but think that this mode of computing steam tonnage is erroneous, for it is based on the presumption that such steamers are always employed in some trade, and are actually engaged in the transport of merchandise. On the contrary, it is well known that a great many more steamers are idle than sailing vessels. Of course, if a steamer is laid up she ought not to be reckoned at any more than her actual measurement,

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as her effective tonnage is then only the same as any other vessel that is out of employment. In view of the many varieties in the manner of constructing our American steamers, there are great discrepancies in their measurement, so that their actual tonnage, as computed, has often little or no comparison to their available capacity in transporting merchandise. Any attempt to more than approximate the effective tonnage of several hundred steamers of all sizes and classes would be attended with errors. In view, therefore, of the fact that a large part of them, especially in this country (where the navigation of our lakes and rivers is suspended for a season), are laid up a portion of the year, I think it more accurate to call the net steam ton equal to two sailing tons, and this estimate is followed in the annexed diagrams illustrating the growth of the steam capacity of the maritime nations.

The subject of international tonnage statistics has been attracting considerable attention since the general adoption of the Moorsom system throughout Europe, but to be exact in these computations there must be an agreement as to the limit of the minimum tonnage of vessels which are considered as forming a part of the national merchant marine. If all countries would, for instance, agree to measure and document all vessels of 10 tons and upwards, and none below that tonnage, the matter would be greatly simplified. Mr. A. N. Kiaer, of the Central Bureau of Statistics of Norway, has made a thorough study of this subject in his valuable treatise entitled "Les Marines Marchandes des differents Pays," from which I have drawn much valuable matter.

Closely connected with the subject of tonnage and the necessity of an international rule of admeasurement of sea-going vessels is the question of the amount of weight or measurement of the cargoes they carry.

We know that the great carrying trades of the world, that of coal, grain, cotton, lumber, petroleum, sugar, guano, ice, iron, wool, fruits, wines, coffee, and tea form the great bulk of cargoes of our merchant shipping. These are the leading commodities probably in the order named, which in their natural and crude state afford employment to the larger part of the world's shipping at the present time; but it is not known in what proportion. It would be an interesting as well as instructive study, that of ascertaining the relative proportion of tons of shipping to tons of cargo, and so to arrive at the approximate amount of tonnage employed in the several trades of the world.

The following tables of the sea-going fleets of the world exhibit the growth of the merchant navies of the different maritime states, distinguishing sailing from steam vessels, during the past fifteen years. The first two tables are from the statistics published yearly by the administration of the Bureau Veritas, and are presumed to include only vessels that navigate the high seas, or such as are over 50 tons if sailing and 100 tons if steam vessels. The tables from the Lloyd's Register, which follow, show the respective merchant fleets of maritime nations, classed in respect to the material of which they are constructed, whether of wood or iron, &c.

Other tables are annexed, showing the comparative progress of shipbuilding in this country and in Great Britain, and the relative increase of the mercantile navies; also the development of the steam tonnage of different countries. The tonnage entered and cleared in each of the chief maritime countries is subjoined, exhibiting the relative proportion of foreign trade performed by the different national merchant fleets.

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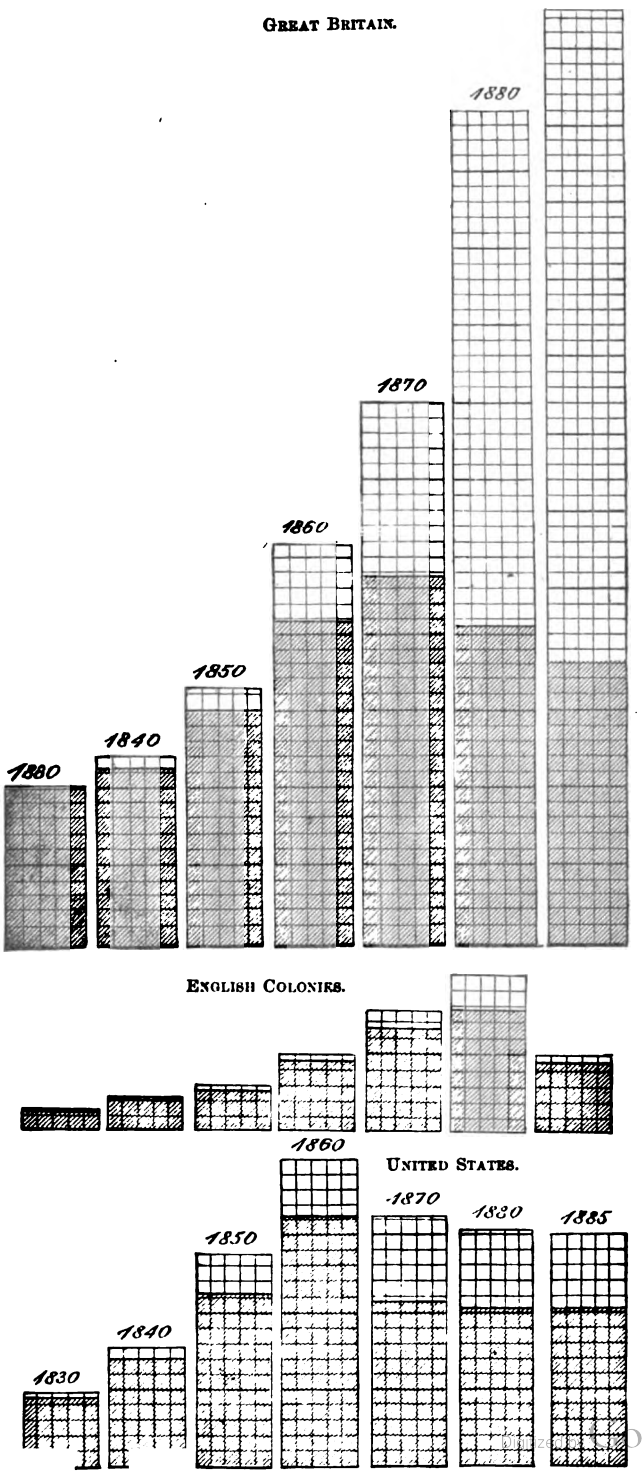
FIG. 10.—*Table illustrating the effective tonnage of different countries, distinguishing steam (One steam register ton is reckoned equivalent to two register tons of sail.)*



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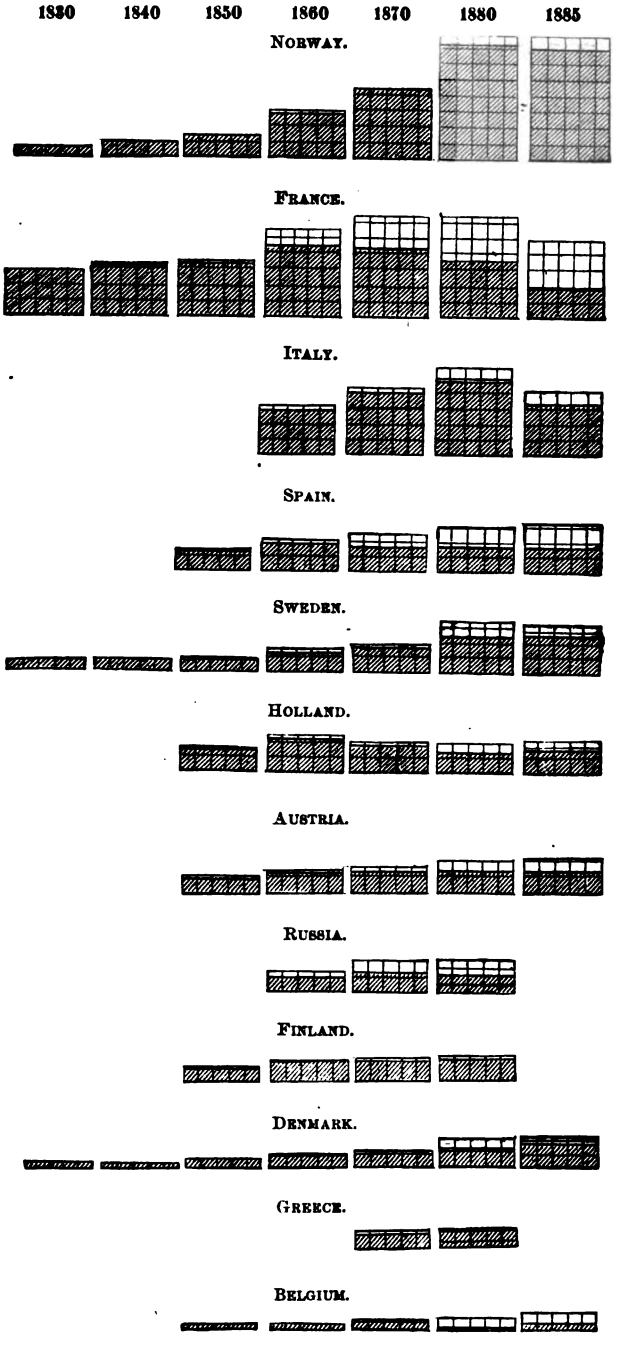
from sailing vessels, and the comparative growth of each from the year 1830 *to* 1885. *The dark shade represents the sailing and the light shade steam tonnage.*



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Sea-going merchant fleets of steam vessels of the world, with the number of such as are 100 *tons or over, and their tonnage, belonging to each nation*, 1870–1886.

Nation.	1870.	1873.	1875.	1877.	1878.	1880.	1881.	1883.	1884.	1885.	1886.
United States:											
Vessels	597	403	578	542	516	548	569	422	350	355	339
Tonnage	513,792	483,040	692,575	674,036	609,101	634,292	666,737	601,186	539,342	545,187	506,668
Great Britain:											
Vessels	2,426	3,061	3,152	3,133	3,216	3,787	4,106	4,649	5,090	4,852	4,806
Tonnage	1,651,767	2,624,431	3,190,922	3,283,910	3,465,187	4,265,519	4,823,043	5,919,819	6,593,610	6,464,362	6,543,615
Norway:											
Vessels	26	88	117	122	121	148	44	209	242	266	275
Tonnage	7,321	41,602	48,322	54,604	53,331	67,636	76,768	105,437	125,691	141,452	147,011
Germany:											
Vessels	127	200	220	220	220	277	304	420	488	509	559
Tonnage	105,131	204,894	287,010	259,785	253,667	289,429	332,033	476,839	550,528	566,697	601,973
France:											
Vessels	288	392	301	272	275	335	361	458	493	505	468
Tonnage	212,976	316,765	312,418	319,179	335,219	423,787	464,179	667,474	782,205	750,061	743,660
Italy:											
Vessels	86	103	111	110	92	103	108	135	143	147	158
Tonnage	36,358	85,045	92,209	95,309	84,421	107,070	111,055	166,020	188,623	201,070	204,058
Russia:											
Vessels	62	114	145	145	148	166	179	194	204	210	218
Tonnage	28,422	67,522	112,252	105,040	104,702	128,729	134,550	149,637	157,696	161,110	165,447
Spain:											
Vessels	148	202	216	224	199	226	237	282	301	314	356
Tonnage	72,845	138,675	144,859	176,319	152,708	205,498	220,085	305,150	345,682	363,908	399,577
Sweden:											
Vessels	83	143	207	210	182	258	249	252	292	311	329
Tonnage	18,633	53,327	83,980	87,257	78,318	98,969	95,429	103,415	117,947	130,180	137,877
Holland:											
Vessels	82	95	115	110	111	111	112	127	145	174	167
Tonnage	39,405	72,753	114,625	112,879	116,149	118,260	119,021	155,820	188,491	214,538	210,549
Greece:											
Vessels	8	8	11	12	12	20	18	47	52	55	57
Tonnage	3,267	3,390	6,689	7,621	7,721	14,236	16,373	40,696	49,761	51,878	54,614
Austria:											
Vessels	74	91	77	74	75	82	86	94	99	102	105
Tonnage	44,312	84,155	79,370	83,545	83,786	98,142	91,157	113,636	119,487	130,447	135,145
Denmark:											
Vessels	44	71	76	96	103	109	115	145	160	177	174
Tonnage	12,085	34,498	47,840	61,671	68,963	74,987	79,888	106,574	121,464	155,344	127,830
South America:											
Vessels			77	82	74	87	89	102	118	140	58
Tonnage			55,310	58,649	50,779	61,198	62,296	75,537	84,731	95,673	47,557

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Central America:											
Vessels			6	13	14	10	14	18	20	2	3
Tonnage			4,462	10,152	10,888	4,572	6,116	8,486	22,068	719	1,708
Asia:											
Vessels			6	22	29	33	35	105	106	112	12
Tonnage			4,347	29,314	36,270	38,984	40,162	92,033	96,320	106,282	13,217
Portugal:											
Vessels	18	17	25	26	17	17	19	20	24	23	27
Tonnage	13,126	14,586	19,372	22,480	16,678	16,258	19,170	17,949	23,705	22,299	26,515
Belgium:											
Vessels	14	42	38	25	27	40	163	52	53	60	62
Tonnage	10,442	30,441	38,950	35,461	38,591	64,778	74,119	90,717	95,965	108,207	111,746
Turkey:											
Vessels		9	29	33	30	10	10	10	13	14	17
Tonnage		3,049	28,430	30,467	27,629	8,866	8,866	8,866	11,376	10,144	11,770
Mexico:											
Vessels										13	12
Tonnage										18,285	18,456
Japan:											
Vessels											101
Tonnage											92,479
Brazil:											
Vessels											82
Tonnage											49,216
Roumania:											
Vessels						1	1	1	2	3	3
Tonnage						166	166	166	1,434	1,666	2,125
Egypt:											
Vessels									28	31	28
Tonnage									31,947	35,662	32,674
Tunis:											
Vessels					1	1	1	1	1	2	2
Tonnage					1,067	1,067	1,067	1,067	1,067	1,762	1,762
Zanzibar:											
Vessels							1	1	1	2	2
Tonnage							1,124	1,124	1,124	2,828	2,828
Various:											
Vessels	49	109				5	3	18	8	15	17
Tonnage	23,550	70,007				9,552	7,131	18,890	4,024	8,783	14,371
Total:											
Vessels	4,132	5,148	5,519	5,471	5,462	6,392	6,857	7,764	8,433	8,394	8,547
Tonnage	2,793,432	4,328,193	5,364,492	5,507,609	5,593,175	6,745,198	7,475,851	9,232,096	10,209,468	10,269,504	10,403,958

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Sea-going merchant fleets of sailing vessels of the world, with the number of vessels and their tonnage belonging to each nation, 1870–1886.

Nation.	1870.	1873.	1875.	1877.	1878.	1880.	1881.	1883.	1884.	1885.	1886.
United States:											
Vessels	7,025	6,786	7,312	6,307	6,050	5,958	6,045	6,214	6,344	6,284	6,102
Tonnage	2,400,607	2,132,838	2,387,876	2,146,731	2,075,832	2,048,975	2,055,087	2,099,218	2,161,490	2,138,880	2,060,258
Great Britain:											
Vessels	23,165	20,832	19,709	17,765	18,894	18,352	18,403	17,875	15,384	14,959	14,584
Tonnage	6,993,153	5,320,089	5,543,567	5,526,930	5,596,018	5,486,666	5,435,851	5,271,160	4,752,059	4,714,746	4,654,214
Norway:											
Vessels	3,652	3,930	4,718	4,135	4,157	4,160	4,178	4,003	4,056	4,086	3,813
Tonnage	969,882	1,137,177	1,360,063	1,352,949	1,374,824	1,371,721	1,396,289	1,366,941	1,415,795	1,443,741	1,373,512
Germany:											
Vessels	4,320	3,834	3,477	3,140	3,201	3,113	3,011	2,614	2,471	2,424	2,328
Tonnage	1,046,044	893,952	853,290	875,844	914,674	953,856	945,096	894,558	864,661	863,611	849,869
France:											
Vessels	4,968	3,973	3,877	3,300	2,972	2,772	2,678	2,434	2,343	2,173	2,136
Tonnage	891,828	768,059	751,854	666,767	595,033	541,853	514,101	452,316	431,495	396,561	385,631
Italy:											
Vessels	3,395	4,220	4,469	4,402	3,135	2,936	3,018	3,084	3,037	2,869	2,776
Tonnage	907,570	1,126,032	1,222,382	1,296,985	963,625	913,782	930,576	915,049	890,422	848,823	825,455
Russia:											
Vessels	1,306	1,327	1,759	1,802	1,814	1,875	2,113	2,131	2,139	2,159	2,157
Tonnage	346,176	347,744	383,841	417,973	413,932	426,226	470,342	468,272	467,740	472,479	469,098
Spain:											
Vessels	3,036	2,867	2,888	2,744	1,590	1,578	1,568	1,554	1,502	1,381	1,450
Tonnage	545,607	510,211	551,201	550,533	329,215	325,036	322,441	308,779	299,340	272,063	269,578
Sweden:											
Vessels	1,930	1,827	2,018	1,941	1,901	1,979	1,985	1,950	1,963	1,961	1,960
Tonnage	340,188	327,409	389,062	402,348	413,719	399,237	404,958	399,602	406,583	407,521	403,887
Holland:											
Vessels	1,690	1,447	1,471	1,258	1,292	1,112	1,149	1,153	965	952	940
Tonnage	444,111	397,232	403,788	366,284	365,367	332,750	342,545	332,519	280,880	277,945	276,480
Greece:											
Vessels	1,860	1,955	2,092	2,024	1,969	1,672	1,770	1,865	1,358	1,302	1,348
Tonnage	375,680	392,894	418,689	419,478	406,018	321,777	341,770	362,891	266,804	254,760	268,246
Austria:											
Vessels	852	965	980	652	626	599	597	538	511	510	464
Tonnage	317,780	336,113	329,970	253,730	246,006	237,790	229,435	210,919	207,325	209,445	192,590
Denmark:											
Vessels	1,415	1,226	1,291	1,203	1,180	1,172	1,165	1,160	1,158	1,150	991
Tonnage	183,510	170,834	176,941	182,870	178,363	177,839	178,799	181,341	181,733	181,033	154,652
South America:											
Vessels			288	355	279	254	262	324	378	385	290
Tonnage			110,246	129,901	96,782	86,400	89,387	113,466	140,687	141,415	119,281
Central America:											
Vessels			99	57	144	144	157	119	118	55	52
Tonnage			31,674	18,546	56,981	47,702	50,243	32,191	29,956	19,334	21,176

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Asia:											
Vessels			34	56	52	54	57	151	125	118	18
Tonnage			18,513	21,079	19,381	21,593	22,881	48,548	38,585	35,375	7,378
Portugal:											
Vessels	368	415	444	441	421	424	434	458	374	369	365
Tonnage	87,018	93,815	107,194	106,215	100,105	99,572	99,841	109,430	81,513	82,049	80,225
Belgium:											
Vessels	72	46	51	25	25	29	30	27	30		25
Tonnage	26,148	14,704	19,555	13,053	11,275	13,067	12,121	8,544	8,859		7,231
Turkey:											
Vessels		224	281	300	312	374	390	402	423	413	416
Tonnage		34,711	43,695	50,101	58,853	61,738	63,729	65,325	68,058	67,605	69,627
Mexico:											
Vessels										44	43
Tonnage										8,070	7,987
Brazil:											
Vessels											106
Tonnage											29,090
Roumania:											
Vessels						20	19	21	20	19	19
Tonnage						3,443	3,184	3,636	3,494	3,354	3,354
Liberia:											
Vessels				5	5	2	3	4		2	2
Tonnage				913	642	317	999	2,545		317	317
Tunis:											
Vessels						2	2	2		3	3
Tonnage						188	188	188		258	258
Japan:											
Vessels											105
Tonnage											29,909
Various:											
Vessels	464	407			10	3	3	1	11	70	30
Tonnage	147,196	152,022			5,577	1,452	1,452	139	3,657	21,068	063
Total:											
Vessels	59,518	56,281	57,258	51,912	49,524	48,584	49,037	48,074	44,734	45,692	42,545
Tonnage	16,042,498	14,185,836	15,099,001	14,799,180	14,317,430	13,872,881	13,911,915	13,647,877	13,010,879	12,867,375	12,571,384

Sea-going fleet.	Vessels.	Tons.
Steam	45,545	12,571,384
Sailing	8,547	10,403,958
Total	54,092	22,975,342

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Ship-building in the United States and Great Britain compared in the years 1860 *to* 1886, *inclusive.*

Years.	United States.		United Kingdom.		
	Total built.	Sold abroad.	Built for British flag.	For foreign flags.	Total.
	Tons.	*Tons.*	*Tons.*	*Tons.*	*Tons.*
1860	212,892	17,418	211,968	13,903	225,871
1861	233,194	26,649	200,839	7,487	208,326
1862	175,075	117,756	241,399	20,533	261,932
1863	310,848	222,199	364,724	17,320	382,044
1864	415,740	300,865	433,045	35,457	468,502
1865	383,805	133,832	415,204	36,665	451,869
1866	336,146	22,117	341,189	48,651	389,140
1867	303,528	9,088	269,080	41,893	310,973
1868	285,304	13,757	316,197	65,385	372,582
1869	275,230	19,063	354,287	36,159	390,446
1870	276,953	17,079	342,706	52,621	395,327
1871	273,226	13,534	354,355	36,783	391,138
1872	209,052	19,572	392,971	81,787	474,758
1873	295,245	29,763	370,666	83,157	453,823
1874	432,725	77,054	521,203	95,541	616,744
1875	297,638	25,541	420,551	65,351	485,902
1876	203,585	33,253	360,365	17,669	378,034
1877	176,592	24,724	433,650	20,704	454,354
1878	235,503	43,607	428,245	44,956	473,201
1879	193,030	43,312	356,835	49,872	406,707
1880	157,409	26,883	403,841	69,440	473,281
1881	280,459	28,671	501,184	113,032	614,216
1882	282,269	18,275	667,275	116,223	783,498
1883	265,430	37,385	768,576	123,910	892,486
1884	225,515	28,722	497,442	93,171	590,613
1885	159,056	26,213	.....	.....	.....
1886	95,453	33,063	.....	.....	.....

Comparative growth of the tonnage of the merchant navies of the United States and of the principal maritime countries of Europe from 1830 *to* 1886.

Countries.	1830.	1840.	1850.	1860.	1870.	1875.	1877.	1878.
United States	1,167,922	2,140,625	3,485,266	5,299,175	4,194,740	4,853,732	3,242,600	4,212,765
Great Britain	2,531,819	3,311,538	4,232,962	5,710,968	7,149,134	7,744,237	8,133,837	8,329,421
France	.....	662,500	688,153	996,124	1,072,048	1,028,228	980,128	975,863
Norway	169,197	276,697	298,315	558,927	1,022,515	1,419,308	1,493,041	1,526,689
Sweden	.....	.....	.....	.....	340,862	507,049	529,945	536,610
Denmark	.....	.....	.....	.....	178,646	244,100	252,062	251,209
German Empire	.....	.....	.....	.....	982,355	1,084,882	1,117,935	1,129,129
Holland	.....	.....	292,576	433,922	389,614	410,689	363,256	358,995
Belgium	.....	22,610	34,919	33,111	30,149	50,186	48,405	60,708
Italy	.....	.....	.....	.....	1,012,164	1,044,337	1,068,449	1,029,157
Austro-Hungarian Empire	.....	.....	.....	.....	329,377	290,450	283,189	286,078
Greece	.....	.....	.....	263,075	404,063	262,032	.....	.....

Countries.	1879.	1880.	1881.	1882.	1883.	1884.	1885.	1886.
United States	4,169,601	4,068,034	4,057,734	4,165,933	4,235,487	4,271,229	4,265,934	4,131,186
Great Britain	8,462,364	8,447,171	8,575,560	8,796,517	9,131,418	9,314,496	9,410,924	.....
France	932,553	919,298	914,378	983,017	1,003,679	1,020,221	.....	.....
Norway	1,510,669	1,518,655	1,520,404	1,530,004	1,546,793	.....	.....	.....
Sweden	530,803	542,642	529,613	527,456	.....	.....	.....	.....
Denmark	251,958	249,466	253,409	256,858	260,896	.....	.....	.....
German Empire	1,171,286	1,182,097	1,194,407	1,226,650	1,269,477	.....	.....	.....
Holland	347,665	328,281	305,046	302,790	309,764	.....	.....	.....
Belgium	71,191	75,666	77,840	82,647	86,360	.....	.....	.....
Italy	1,005,972	999,196	989,057	990,004	973,333	.....	.....	.....
Austro-Hungarian Empire	282,571	290,971	286,556	288,011	280,184	.....	.....	.....
Greece	.....	.....	.....	.....	.....	.....	.....	.....

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Tonnage of steam vessels only belonging to the United States and to the principal maritime countries of Europe in each of the years 1840, 1850, 1860, 1870, *and* 1875 *to* 1886.

Countries.	1840.	1850.	1860.	1870.	1875.	1880.
	Tons.	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*
United States	202,339	525,947	867,937	1,075,095	1,168,668	1,211,558
British Empire	95,807	187,631	500,144	1,202,184	2,072,804	2,949,282
France	9,535	13,925	68,025	154,415	205,420	277,759
Norway	.....	.....	.....	13,715	43,875	58,062
Sweden	.....	.....	.....	.....	83,007	81,049
Denmark	.....	.....	.....	10,453	39,368	51,957
German Empire	.....	.....	.....	81,994	183,569	215,758
Holland	.....	2,706	10,132	19,455	59,925	64,394
Belgium	.....	1,604	4,254	9,501	35,430	65,224
Italy	.....	.....	.....	32,100	57,147	77,050
Austro-Hungarian Empire	.....	.....	.....	49,977	56,271	62,743
Greece	.....	.....	.....	5,360	8,241	.....

Countries.	1881.	1882.	1883.	1884.	1885.	1886.
	Tons.	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*
United States	1,264,998	1,355,825	1,413,194	1,465,909	1,494,917	1,522,984
British Empire	3,239,503	3,571,078	4,013,677	4,249,442	.....	.....
France	311,779	416,228	467,488	.....	.....	.....
Norway	65,627	82,519	92,084	.....	.....	.....
Sweden	79,245	87,524	.....	.....	.....	.....
Denmark	61,426	70,706	81,042	.....	.....	.....
German Empire	251,648	311,204	374,699	.....	.....	.....
Holland	72,224	85,273	101,667	.....	.....	.....
Belgium	70,486	75,897	79,902	.....	.....	.....
Italy	93,698	104,719	107,452	.....	.....	.....
Austro-Hungarian Empire	65,755	78,433	76,780	.....	.....	.....
Greece	.....	.....	.....	.....	.....	.....

Amount of tonnage entered and cleared at the ports of the United States and the principal nations of Europe, with the percentage of the same under the national flag of each country, from the year 1850 *to* 1860 *and* 1870 *to the present time.***

Years.	United States.		United Kingdom.		Germany.		Holland.	
	Tonnage.	Per cent. of total tonnage.	Tonnage.	Per cent. of total tonnage.	Tonnage.	Per cent. of total tonnage.	Tonnage.	Per cent. of total tonnage.
1850	8,709,641	59.8	14,505,064	65.1	.....	.....	1,744,419	41.8
1860	17,065,125	70.8	24,689,292	56.3	.....	.....	2,648,084	39.5
1870	18,825,062	38.2	36,640,182	68.4	3,489,247	35.9	3,638,638	28.3
1871	19,907,666	37.6	41,547,878	67.5	4,864,803	41.1	4,428,089	25.8
1872	21,540,157	34.3	42,501,025	67.6	5,291,142	48.3	4,317,419	27.5
1873	23,517,413	31.2	44,439,986	66.7	10,385,714	41.8	4,678,479	25.2
1874	26,278,264	30.0	45,428,957	66.2	11,167,112	39.4	4,721,629	25.6
1875	23,589,317	31.0	46,276,838	66.9	10,741,983	38.2	4,681,582	26.9
1876	25,165,862	29.2	50,784,902	65.9	11,297,998	37.4	5,597,568	25.4
1877	26,897,178	27.6	51,531,077	67.5	11,733,839	37.2	5,878,839	27.4
1878	29,271,335	25.7	51,595,079	68.4	11,427,507	37.8	6,227,144	29.1
1879	32,268,427	21.3	52,715,450	71.0	12,370,985	37.6	6,356,448	30.7
1880	36,073,505	18.9	58,736,063	70.4	13,066,412	39.1	6,844,084	30.9
1881	36,789,131	18.0	57,949,545	71.7	12,896,235	40.0	7,043,238	29.7
1882	35,857,501	19.0	61,491,255	71.0	14,010,753	40.8	8,010,149	28.4
1883	32,922,623	19.9	64,961,753	72.4	15,732,388	40.0	7,866,824	29.4
1884	30,271,936	21.3	64,272,522	72.6	.....	.....	.....	.....
1885	.....	.....	.....	.....	.....	.....	.....	.....
1886	.....	.....	.....	.....	.....	.....	.....	.....

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Amount of tonnage entered and cleared at the ports of the United States, &c.—Continued.

Year.	France.		Portugal.		Spain.		Italy.	
	Tonnage.	Per cent. of total tonnage.	Tonnage.	Per cent. of total tonnage.	Tonnage.	Per cent. of total tonnage.	Tonnage.	Per cent. of total tonnage.
1850	4,610,719	41.0	.....	.....	.....	.....	.....	.....
1860	8,456,736	41.4	.....	.....	2,596,568	30.7	.....	.....
1870	13,606,737	31.5	.....	.....	3,542,194	37.0	7,621,443	36.5
1871	15,546,110	31.0	.....	.....	4,720,790	41.9	8,433,987	37.0
1872	14,597,788	34.2	.....	.....	6,307,363	33.1	8,968,037	36.4
1873	15,741,289	32.7	4,831,216	7.2	6,645,360	33.4	8,768,429	35.1
1874	16,243,277	33.2	5,929,715	7.7	6,8 9,931	32.9	7,580,317	36.8
1875	16,717,412	32.6	5,505,403	7.3	6,612,881	33.9	8,084,595	34.2
1876	18,062,180	31.7	4,652,159	8.3	5,783,695	36.3	7,354,810	36.5
1877	18,280,816	32.8	5,056,000	7.3	7,769,927	32.1	7,831,789	37.5
1878	20,010,357	30.1	4,912,054	6.8	8,273,876	33.9	8,152,824	39.0
1879	22,886,180	28.0	5,470,577	6.0	9,800,224	31.9	9,142,631	35.7
1880	25,032,478	30.0	5,815,851	4.1	13,743,114	26.6	9,816,970	34.8
1881	24,835,539	32.7	5,942,288	5.0	13,978,290	30.4	9,211,002	31.6
1882	26,193,987	32.6	6,434,869	4.8	18,320,608	36.1	10,308,793	29.3
1883	27,785,116	34.1	.....	.....	.....	.....	11,299,996	26.1
1884	.....	.....	.....	.....	.....	.....	.....	.....

Year.	Norway.		Sweden.		Denmark.		Russia.	
	Tonnage.	Per cent. of total tonnage.	Tonnage.	Per cent. of total tonnage.	Tonnage.	Per cent. of total tonnage.	Tonnage.	Per cent. of total tonnage.
1850	1,396,945	75.2	1,066,886	43.4	.....	.....	.....	.....
1860	2,030,036	74.5	1,388,452	40.3	.....	.....	4,214,774	16.5
1870	3,231,986	70.0	4,328,584	31.8	.....	.....	7,015,102	11.2
1871	3,311,330	71.7	4,522,815	32.5	.....	.....	7,584,936	11.0
1872	3,530,390	67.8	5,282,068	33.5	.....	.....	6,313,566	12.2
1873	3,664,098	69.9	5,492,109	39.4	.....	.....	7,319,918	13.2
1874	3,529,212	68.4	5,823,942	40.5	3,648,518	39.7	8,581,420	10.4
1875	3,608,165	71.1	5,279,849	34.0	3,594,792	49.3	8,158,428	9.8
1876	3,743,149	67.4	6,073,443	33.8	3,740,125	51.4	8,828,506	9.6
1877	3,954,279	66.5	6,652,167	34.1	3,913,558	53.4	7,847,820	8.2
1878	3,917,096	70.0	6,271,166	36.0	3,755,894	58.0	13,090,348	12.2
1879	3,626,740	70.5	6,240,795	35.4	3,908,011	54.8	12,605,844	13.5
1880	3,985,477	68.2	6,894,155	37.2	4,461,494	52.7	.....	.....
1881	4,101,968	67.4	7,006,254	35.4	4,943,701	40.0	8,566,368	10.6
1882	4,463,539	66.5	8,537,684	35.5	5,369,577	54.0	.....	.....
1883	.....	.....	.....	.....	5,917,152	52.4	.....	.....
1884	.....	.....	.....	.....	.....	.....	.....	.....
1885	.....	.....	.....	.....	.....	.....	.....	.....

Number, tonnage, and description of the steamers of 100 *tons gross and upwards, belonging to each of the several countries of the world, as recorded by the Universal Register (excluding yachts).*

Flag.	Wood.		Iron.		Total.	
	No.	Tons.	No.	Tons.	No.	Tons.
United States	183	168,500	205	327,362	388	495,862
Great Britain	366	102,598	5,346	6,437,025	5,712	6,539,623
Argentine	.....	.....	17	8,681	17	8,681
Austrian	7	1,640	108	130,821	115	132,461
Belgian	3	1,244	60	98,340	63	99,584
Bolivian	1	1,032	.....	.....	1	1,032
Brazilian	3	779	83	42,138	86	42,917
Chilian	.....	.....	40	41,851	40	41,851
Chinese	3	4,159	20	20,860	23	32,219
Costa Rican	.....	.....	2	528	2	528
Danish	9	2,668	197	140,171	206	142,839

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Number, tonnage, and description of the steamers of 100 *tons gross and upwards, &c.*—Cont'd.

Flag.	Wood.		Iron.		Total.	
	No.	Tons.	No.	Tons.	No.	Tons.
Dutch	6	4,032	146	186,418	152	190,445
French	5	1,345	503	730,796	508	738,141
German	4	772	555	603,145	559	603,917
Greek	5	745	69	53,127	74	53,872
Hawaiian	18	5,977	2	1,986	20	7,963
Haytian	1	231	4	2,155	5	2,386
Italian	3	1,412	150	193,893	153	195,305
Japanese	55	23,259	49	54,482	104	77,741
Mexican	3	612	12	16,363	15	16,975
Norwegian	75	25,818	207	114,609	282	140,427
Persian	.....	.....	1	838	1	838
Peruvian	.....	.....	7	7,695	7	7,695
Portuguese	2	308	23	21,668	25	21,976
Roumanian	1	232	3	3,515	4	3,747
Russian	10	2,546	199	148,714	209	151,260
Sarawak	.....	.....	3	1,035	3	1,035
Siamese	.....	.....	4	1,027	4	1,027
Spanish	32	12,474	369	348,532	401	361,006
Swedish	111	25,713	310	124,081	421	149,794
Turkish	2	221	30	24,898	32	25,119
Uruguayan	.....	.....	7	2,281	7	2,281
Venezuelan	.....	.....	2	481	2	481
Zanzibar	.....	.....	1	213	1	213
Total	908	278,261	8,734	9,902,924	9,642	10,291,241

Number, tonnage, and description of the sailing vessels of 100 *tons net and upwards, belonging to each of the several countries of the world, as recorded in the Universal Register (excluding yachts).*

Flag.	Wood.		Iron.		Total.		Grand total.	
	No.	Tons.	No.	Tons.	No.	Tons.	No.	Tons.
United States	3,536	1,579,485	6	7,655	3,542	1,587,140	3,930	2,083,002
Great Britain	6,131	2,359,592	1,750	2,265,877	7,881	4,625,469	13,593	11,165,092
Argentine	16	4,133	7	1,504	23	5,637	40	14,318
Austrian	372	190,846	3	3,343	375	194,189	490	326,650
Belgian	7	4,042	2	1,241	9	5,283	72	104,867
Bolivian	.....	.....	.....	.....	.....	.....	1	1,032
Brazilian	114	20,201	2	200	116	20,401	203	63,318
Chilian	118	63,302	1	872	119	64,174	159	106,025
Chinese	2	655	.....	.....	2	655	25	32,874
Colombian (S. A.)	2	477	.....	.....	2	477	2	477
Costa Rican	1	140	.....	.....	1	140	3	668
Danish	657	126,942	1	653	658	127,595	804	270,434
Dutch	517	207,908	25	20,760	542	228,668	694	419,113
French	1,137	278,557	57	40,155	1,194	318,712	1,702	1,056,853
German	1,646	682,743	148	123,454	1,794	806,197	2,353	1,410,114
Greek	1,249	288,799	2	586	1,251	289,385	1,325	343,257
Hawaiian	5	2,273	.....	.....	5	2,273	25	10,236
Haytian	.....	.....	.....	.....	.....	.....	5	2,386
Italian	1,671	703,735	3	1,548	1,674	705,283	1,827	900,588
Japanese	119	31,276	1	386	120	31,662	224	109,403
Mexican	10	1,981	1	198	11	2,174	26	19,149
Montenegrin	7	1,179	.....	.....	7	1,179	7	1,179
Norwegian	3,366	1,349,173	3	2,813	3,369	1,351,986	3,651	1,492,413
Persian	.....	.....	.....	.....	.....	.....	1	838
Peruvian	18	5,373	.....	.....	18	5,373	25	13,068
Portuguese	212	49,906	2	1,134	214	51,040	239	73,016
Roumanian	.....	.....	.....	.....	.....	.....	4	3,747
Russian	930	270,280	1	660	931	270,940	1,140	422,200
Sarawak	1	347	.....	.....	1	347	4	1,382
Siamese	16	6,414	.....	.....	16	6,414	20	7,441
Spanish	642	154,481	13	4,635	655	159,116	1,056	520,122
Swedish	1,127	329,374	3	1,687	1,130	331,061	1,551	480,855
Tahitian	1	244	.....	.....	1	244	1	244
Turkish	102	22,889	.....	.....	102	22,889	134	48,008
Uruguayan	2	342	.....	.....	2	342	9	2,623
Venezuelan	1	170	.....	.....	1	170	3	651
Zanzibar	.....	.....	.....	.....	.....	.....	1	213
Total	23,735	8,737,257	2,031	2,479,356	25,766	11,216,615	35,408	21,507,856

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Number, tonnage, and description of the sailing vessels of 100 tons net and upwards, belonging to each of the several countries of the world, as recorded in the Universal Register (excluding yachts).

Flag.	Wood.		Iron.		Total.		Grand total.	
	No.	Net tonnage.	No.	Net tonnage.	No.	Tonnage.	No.	Tonnage.
United States	3,536	1,579,485	6	7,655	3,542	1,587,140	3,930	2,083,002
Great Britain	6,131	2,859,592	1,750	2,265,877	7,881	4,625,469	13,593	11,165,092
Argentine	16	4,133	7	1,504	23	5,637	40	14,318
Austrian	372	190,846	3	3,343	375	194,189	490	326,650
Belgian	7	4,042	2	1,241	9	5,283	72	104,867
Bolivian							1	1,032
Brazilian	114	20,201	2	200	116	20,401	202	63,318
Chilian	118	63,302	1	872	119	64,174	159	106,025
Chinese	2	655			2	655	25	32,874
Colombian	2	477			2	477	2	477
Costa Rican	1	140			1	140	3	668
Danish	657	126,942	1	653	658	127,595	864	270,434
Dutch	517	207,908	25	20,760	542	228,668	694	419,113
French	1,137	278,557	57	40,155	1,194	318,712	1,702	1,056,853
German	1,646	682,743	148	123,454	1,794	806,197	2,353	1,410,114
Greek	1,249	288,799	2	586	1,251	289,385	1,325	343,257
Hawaiian	5	2,273			5	2,273	25	10,236
Haytian							5	2,386
Italian	1,671	703,735	3	1,548	1,674	705,283	1,827	900,588
Japanese	119	31,276	1	386	120	31,662	224	109,403
Mexican	10	1,981	1	198	11	2,174	26	19,149
Montenegrin	7	1,179			7	1,179	7	1,179
Norwegian	3,366	1,349,173	3	2,813	3,369	1,351,986	3,651	1,492,418
Persian							1	838
Peruvian	18	5,373			18	5,373	25	13,068
Portuguese	212	49,906	2	1,134	214	51,040	239	73,016
Roumanian							4	3,747
Russian	930	270,280	1	660	931	270,940	1,140	422,200
Sarawak	1	347			1	347	4	1,382
Siamese	16	6,414			16	6,414	20	7,441
Spanish	642	154,481	13	4,635	655	159,116	1,056	520,122
Swedish	1,127	329,374	3	1,687	1,130	331,061	1,551	480,855
Tahitian	1	244			1	244	1	244
Turkish	102	22,889			102	22,889	134	48,008
Uruguayan	2	342			2	342	9	2,623
Venezuelan	1	170			1	170	3	651
Zanzibar							1	213
Total	23,735	8,737,257	2,031	2,479,356	25,766	11,216,615	35,408	21,507,856

Number, tonnage, and description of the steamers of 100 tons gross and upwards, belonging to each of the several countries of the world, as recorded by the Universal Register (excluding yachts).

Flag.	Wood.			Iron.			Total.		
	No.	Net tonnage.	Gross tonnage.	No.	Net tonnage.	Gross tonnage.	No.	Net tonnage.	Gross tonnage.
United States	183	129,109	168,500	205	229,544	327,362	388	358,653	495,862
Great Britain	366	62,382	102,598	5,346	4,058,751	6,437,025	5,712	4,121,133	6,539,623
Argentine				17	5,595	8,681	17	5,595	8,681
Austrian	7	964	1,640	108	86,489	130,821	115	87,453	132,461
Belgian	3	891	1,244	60	66,893	98,340	63	67,784	99,584
Bolivian	1	772	1,032				1	772	1,032
Brazilian	3	589	779	83	31,989	42,138	86	32,578	42,917
Chilian				40	27,710	41,851	40	27,710	41,851
Chinese	3	2,734	4,150	20	18,409	28,060	23	21,143	32,219
Colombian (S. A.)									
Costa Rican				2	425	528	2	425	528
Danish	9	1,987	2,608	197	94,324	140,171	206	96,311	142,839
Dutch	6	2,546	4,032	146	127,771	186,413	152	130,317	190,445
French	5	1,037	1,345	503	491,655	736,796	508	492,692	738,141
German	4	527	772	555	409,031	603,145	559	409,558	603,917
Greek	5	387	745	69	36,302	53,127	74	36,689	53,872
Hawaiian	18	4,805	5,977	2	1,538	1,986	20	6,343	7,963
Haytian	1	175	281	4	1,422	2,155	5	1,597	2,386

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Number, tonnage, and description of the steamers of 100 *tons gross and upward, &c.*—Cont'd.

Flag.	Wood.			Iron.			Total.		
	No.	Net tonnage.	Gross tonnage.	No.	Net tonnage.	Gross tonnage.	No.	Net tonnage.	Gross tonnage.
Italian	3	873	1,412	150	122,130	193,893	153	123,003	195,305
Japanese	55	16,421	23,259	49	33,537	54,482	104	49,958	77,741
Mexican	3	436	612	12	11,034	16,363	15	11,470	16,975
Montenegrin									
Norwegian	75	18,200	25,818	207	86,504	114,609	282	104,704	140,427
Persian				1	579	838	1	579	838
Peruvian				7	5,731	7,695	7	5,731	7,695
Portuguese	2	238	308	23	14,203	21,668	25	14,441	21,976
Roumanian	1	183	232	3	2,222	3,515	4	2,405	3,747
Russian	10	2,099	2,546	199	104,642	148,714	209	106,741	151,260
Sarawak				3	622	1,035	3	622	1,035
Siamese				4	684	1,027	4	684	1,027
Spanish	32	8,504	12,474	369	230,554	348,532	401	239,148	361,006
Swedish	111	22,262	25,718	810	92,562	124,081	421	114,824	149,794
Tahitian									
Turkish	2	50	221	30	19,714	14,898	32	19,764	25,119
Uruguayan				7	1,772	2,281	7	1,772	2,281
Venezuelan				2	399	481	2	399	481
Zanzibar				1	138	213	1	138	213
Total	908	278,261	388,317	8,734	6,414,875	9,902,924	9,642	6,693,136	10,291,241

Number, tonnage, and description of all vessels of 100 *tons and upwards, built by each of the several countries of the world during* 1885.

Country in which built.	Whether steam or sail.	Wood.		Composite.		Iron.		Steel.		Total.	
		No.	Tonnage.	No.	Tonnage.	No.	Tonnage.	No.	Tonnage.	No.	Tonnage.
United States	Sail	42	26,017							42	26,017
Do	Steam	7	5,616			8	8,362			15	13,978
United Kingdom	Sail	20	5,429			92	143,439	29	35,440	141	184,308
Do	Steam	4	455	4	1,891	143	143,332	90	119,839	241	265,517
British colonies	Sail	53	30,712			1	180			54	30,892
Do	Steam	8	2,101			5	6,719	1	234	14	4,054
Austria	Sail	2	359			1	1,071			3	1,430
Do	Steam	1	140			2	559	1	3,839	4	4,538
Denmark	Sail	5	1,059							5	1,059
Do	Steam					2	1,999			2	1,999
France	Sail	13	3,286							13	3,286
Do	Steam			1	148	1	830	6	19,858	8	20,836
Germany	Sail	2	1,457			8	11,110	1	322	11	12,889
Do	Steam	2	759	1	223	21	9,470	7	3,652	31	14,104
Greece	Sail	16	3,126							16	3,126
Do	Steam										
Italy	Sail	18	3,806			1	161			19	3,967
Do	Steam					2	463			2	463
Netherlands	Sail			1	942	8	7,025			9	7,967
Do	Steam			1	120	2	1,024	3	4,121	6	5,265
Norway	Sail	24	9,184							24	9,184
Do	Steam	2	995			2	663	2	1,623	6	3,281
Russia	Sail	8	2,027							8	2,027
Do	Steam										
Sweden	Sail	4	1,222							4	1,222
Do	Steam			2	411	4	1,032	2	809	8	2,252
Other countries	Sail	5	803							5	803
Do	Steam	1	194							1	194
Totals	Sail	212	88,487	1	942	111	162,986	30	35,762	354	288,177
Do	Steam	25	10,260	9	2,793	192	169,453	112	153,975	338	336,481
	Total	237	98,747	10	3,735	303	332,439	142	189,737	692	624,658

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GEOGRAPHICAL DISTRIBUTION OF THE WORLD'S TONNAGE.

If we analyze the figures presented in the foregoing tables and proceed to study the geographical distribution of the merchant shipping of the world we are at first struck by the remarkable prominence of the continent of Europe over all other continents.

With a territory which is only 7½ per cent. of that of the globe (the arctic region excepted) the European continent possesses about 75 per cent. of the world's merchant marine.

Next to Europe comes North America, occupying likewise an important place as a ship-owning continent, with about 20 per cent. of the mercantile fleets of the world. The share of all the other continents is estimated at only 5 per cent. of the grand total, and, though this figure might perhaps be doubled by including the ships of China and some other eastern states, of whose tonnage we have no exact data, these continental comparisons would need but little modification.

Africa is the poorest of the continents in ships, which may be explained by the form of her coasts, her lack of ports, and the character of her people, who have scarcely advanced beyond the primitive state and whose commerce is as yet undeveloped.

The merchant marine of Oceanica is likewise very small compared with the territory; but the figure of her tonnage, as compared with those of the population, shows that the English colonists in another hemisphere have preserved the maritime spirit which so much distinguished their ancestors.

If we include only vessels of 50 tons, we find that Europe possesses forty-two to every 1,000 inhabitants, America forty vessels, and Oceanica seventy, while the combined maritime countries of Asia and Africa, enumerated in the table, possess only three vessels per 1,000 inhabitants.

In Europe the bulk of the shipping is owned on the coasts of the North Sea and of the Atlantic Ocean, where maritime industry is most concentrated, and half the whole tonnage of the world, or more than ten millions, is owned at the ports of those coasts.

The enormous concentration of maritime enterprise may be better understood by examining the relatively insignificant area of those coasts on a map of the world.

In the same manner, we notice that North America is the continent which next to Europe is best supplied with mercantile tonnage.

In the ports of North America, situated between the Gulf of St. Lawrence and the Florida peninsula, a tonnage of about 3,500,000 is owned, and it will be seen that the extent of coast is almost equal to that of the region we have just spoken of.

For the third region we must take the coasts of the Baltic Sea and the inner basin of the Mediterranean, at which a tonnage of from one and one-quarter to one and one-third millions is owned.

After these regions, perhaps, comes that of China and Japan.

But let us look at the map and mark the localities in the different countries which form the principal centers of maritime enterprise. This appears to be decided by no settled rule, unless it be an abundance of coast harbors, and hardy, enterprising inhabitants to make use of them.

In Great Britain and Ireland we find that nearly three-quarters of the tonnage belongs to England, 2½ per cent. to Scotland, 3 per cent. to Ireland, and 1 per cent. to the Channel Islands.

The tonnage of the western coast of Great Britain is a little greater

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than that of the eastern, viz, about two and one-quarter millions against three millions of tons, while half of the southern coast follows with a tonnage of only a quarter of a million.

The great ports of Liverpool, in England, and of Glasgow and Greenock, in Scotland, are upon the western coast, and form the most important centers of tonnage.

Liverpool alone possesses about 1,800,000 tons, and the three ports of the Clyde, viz, Glasgow, Port Glasgow, and Greenock, possess over a million tons.

After these come the ports on the Bristol Channel, of which Swansea, Cardiff, and Bristol possess a total of about 200,000 tons; a figure which increases to 275,000 tons when we add to it the tonnage of the five other neighboring ports on the coasts of the same gulf.

The southern coast of England has a few good harbors, but no ports of the first rank; the most important is Southampton, which possesses about 10,000 tons of shipping.

On the east coast there are many large ports possessing an extensive tonnage. London is first, with her million tons and over; Newcastle, with Shields, 400,000 tons; Hull, with Grimsby and Goole, 250,000 tons; Sunderland, 200,000 tons; Hartlepool, with West Hartlepool, 120,000 tons; Dundee, 100,000 tons; and Leith, 80,000 tons. One is struck by the great preponderance of iron tonnage owned in Great Britain, being 97 per cent. of the steam and 55 per cent. of the sailing vessels.

In turning to Denmark we notice that the islands possess the greatest part of the merchant marine, especially Zealand, with over 100,000 or 50 per cent. of the whole, of which about 75,000 tons belong to the port of Copenhagen. The second maritime port of Denmark is Svendborg, in Fionia, with 20,000 tons.

Looking to the Scandinavian Peninsula, we find that the tonnage of the merchant marine of Norway is chiefly spread over the ports of the southern coast, and the ownership is considerable in almost all of them, from Cape Lindesnaes to the Swedish frontier. It is here that maritime matters and shipping are given preference, especially in the neighborhood of Jarlsberg-Larwig, Nedenaes, &c., where nearly all the inhabitants of the country are interested in the ownership of vessels.

The most important shipping ports of this region are Arendal, Drammen, and Christiania, the first of which possesses 150,000 tons, and the other two a little over 100,000 tons each.

In Sweden, also, there are two sections where maritime industry occupies an important place.

One is in the provinces of Göteborg and Bohus upon the eastern coast, which possessed in 1880 a merchant marine of 160,000 tons, of which 90,000 belonged to the city of Göteborg alone; the other region extends from Stockholm to the port of Hernos, and towards the commencement of the outside basin of the Gulf of Bothnia, and is composed of the provinces of Stockholm, Gefleborg, and Vestermorrland. This region possesses almost the same tonnage as the first, or 164,000 tons, but upon a much longer extent of coast.

Its most important ports are Stockholm with 31,000 tons, and Gefle, with 30,000 tons. Among the other provinces, Malmo and Calmar, have 60,000 and 38,000 tons, respectively. Upon the Finnish coast of the Gulf of Bothnia navigation is regarded as of as much importance as in the Swedish ports on the other side of the gulf.

In Finland, as in Sweden, the coasts of the outside basin are less rich in tonnage than those in the south, towards the mouth of the Gulf of

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Finland. In that country the provinces of Abo and Bjorneborg possess the largest merchant marine, viz, 135,000 tons, or about 50 per cent. of the whole tonnage of the maritime ports of Finland. The most important ports in Finland are Brahestad and Wyborg, which, however, possess only 17,000 tons each.

Almost two-thirds of the merchant marine of Russia belong to the ports of the Black and Azof Seas, which possess three-fourths of the tonnage in steamships and sailing vessels.

The ports of the Baltic Sea represent 30 per cent. and those of the White and Glacial Seas 7 per cent. of the whole tonnage.

In Odessa, the great ship-owning port of the Empire, a tonnage of 75,000 tons is owned. Then there are Rostow, at the mouth of the Don, in the Sea of Azof, and Riga, possessing each about 40,000 tons.

The maritime ports of Germany are concentrated at the mouths of the Weser and Elbe, and in the Baltic, between the Trave and Oder Rivers.

The shores of the Weser counted, in 1879, 345,000 tons, of which 217,000 belonged to the city of Bremen, 37,000 to Elsfleth, and 31,000 to Bremerhafen; that of the Elbe possessed 266,000 tons, of which 218,000 belonged to Hamburg.

Among the ports of the Baltic Sea we must name first Rostok, with 103,000 tons; then Danzig, Stettin, Stralsund, and Barth, all possessing, from 43,000 to 48,000 tons each.

Three-quarters of the steamships belong to the two cities of Hamburg and Bremen, of which the first possesses 75,000, and the second 60,000 tons.

In the Low Country there are two great maritime centers, the ports of Amsterdam and Rotterdam, with a number of small ship-owning ports in the provinces of Gröningen and of North and South Holland.

Amsterdam possesses 75,000 tons, of which about 40,000 are in steamships; Rotterdam, 60,000 tons, of which 25,000 are in steamships.

In Belgium the single port of Antwerp possesses 50,000 tons, of which three-fourths are in steamships, representing 96 per cent. of the whole tonnage of the country.

France is divided into three great maritime districts, the coasts northwest, west, and south, the first of which possesses 323,000 tons. As to the maritime development of France, the coast of the Mediterranean is the richest in ships, since it possesses 401 tons per kilometer, not including Corsica, while the coasts west and northwest only count 345 and 264 tons per kilometer.

France has four ports of the first rank, situated at the mouths, or near the mouths, of the large rivers, the Seine, Loire, Garonne, and Rhone. Marseilles possesses the largest tonnage, 220,000 tons, of which 180,000 is in steamships. Next is Havre with 130,000 tons, about half of which is in steam. Nantes has 112,000 tons, or, adding to that the tonnage of St. Nazaire, which in fact is only an outer port of the same estuary, gives her 140,000 tons, 40,000 of which is in steam; and Bordeaux, on the Gironde, which has now about 120,000 tons.

Prominent among other Channel ports are St. Malo and St. Servan, situated near each other, and which count together over 50,000 tons, and Dunkirk, situated near the Belgian boundary, with 45,000 tons.

There are besides a large number of ports of less importance, especially on the coasts of Brittany and the Bay of Biscay, near the mouth of the Loire.

Coming next to the Iberian peninsula, we find that the eastern coast, bordering on the Mediterranean, possesses a larger tonnage than

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the northern, but the tonnage of both cannot rival the neighboring coasts of France.

The eastern coast possesses 204,000 tons on a much greater stretch of territory than Mediterranean France.

The northern coast of Spain has almost the same territory as the western coast of France, but it possesses only 130,000 tons of shipping, or about four-tenths of the tonnage of the latter. The western coast counts over 80,000 tons, of which 75,000 belong to Portugal, while the southern coast has 30,000 tons. Barcelona, with nearly 150,000 tons, and Bilbao, with half that amount, are the largest ports of Spain, after which comes Palma, with 20,000 tons.

In Portugal the largest ports are Lisbon and Oporto, which count about 30,000 tons each.

Maritime property in Italy is concentrated, and especially so in the vicinity of Genoa. Upon a territory of less than 30 miles in extent this region possesses two ports of the first rank, Camogli, with 180,000 tons, and Genoa, with 150,000 tons, beside many secondary ports which almost reach this tonnage, among which are Nervi and Recco, which count together about 40,000 tons. The whole merchant marine of this region amounts to over 500,000 tons, which is more than half of the shipping of all Italy. This may be termed the Italian maritime region *par excellence*. Next to it come the ports of Savana, 40,000 tons; Spezia, 60,000; Leghorn, 25,000; Naples, 60,000; Castellamare, 80,000; Palermo, 49,000 tons, of which 30,000 are steam; Venice, 20,000 tons, not including 15,000 tons in vessels measuring under 50 tons.

In the northeast corner of the Adriatic Sea we reach another maritime region of considerable importance, viz, that of Trieste and Istria, in Austria, and Fiume, in Hungary. The Austrian part of this region counts over 150,000 tons; that of Hungary, 70,000 tons; forming together 220,000 tons upon a territory of 130 miles in a straight line. There are three important ports—Trieste, with 85,000 tons, of which 60,000 are steam; Lussinpiccolo, at the south of the Istrian peninsula, with 60,000 tons; and Fiume, with 56,000 tons. In the southern part of this region there are few vessels until we pass the port of Spalatro, where almost all the ships are built for long voyages and heavy cargoes and belong to Dalmatia, which possesses a tonnage of 60,000 tons. This tonnage is found in the southern half of the province, the chief port of which is Orebiccio.

We next come to the little Kingdom of Greece, which has considerable pretensions to maritime prominence, with her limited area, well studded with islands and harbors. Over half the Grecian marine belongs to the Cyclodes and particularly to the port of Syra, which owns over 100,000 tons.

To return to the American Continent; between the Gulf of St. Lawrence on the north and the Chesapeake Bay on the south, embracing the English possessions of Canada, New Brunswick, Nova Scotia, and Newfoundland, with the coast of the United States known as the New England and Middle States, we find a population largely interested in all kinds of maritime business.

This region, of which the coasts have almost the same extension in straight line as the entire coasts of Europe between Cape Finisterre and Cape Skagen, possessed not less than 3,500,000 tons, and forms the second great maritime center of the world. This tonnage is spread almost equally over the three divisions just named.

The English colonies possess 1,000,000 tons, the New England States 1,050,000 tons, and the Middle States 1,300,000 tons.

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In the British possessions the Provinces of New Brunswick and Nova Scotia are the most important, the first possessing the port of St. John, with over 200,000 tons, and two ports of from 10,000 to 20,000 tons each. The Province of Nova Scotia counts the ports of Yarmouth, with 150,000 tons; Halifax and Windsor, with 90,000 tons each; three ports of from 20,000 to 30,000 tons, and five ports of from 10,000 to 20,000 tons. Among the ports of the other provinces, Quebec possesses 100,000 tons, Montreal 50,000 tons, and St. John's (Newfoundland) 46,000 tons.

Turning to the West Indies the port of Havana possesses the greatest tonnage, viz, 47,000 tons. The second port is Nassau, on New Providence Island, in the Bahaman Archiplago, with about 20,000 tons. But the tonnage of the Antilles and Central America is but a small factor in the world's commerce. The South American nations likewise all have insignificant mercantile fleets, their influence as a result hardly being felt beyond their own shores.

Outside of Europe and North America there appear to be only two ports at which the merchant marine exceeds 50,000 tons, namely, Sydney, in New South Wales, with 75,000 tons, and Melbourne, in Victoria, with 60,000 tons, both situated in the southeastern corner of the continent of Australia, which also possesses some other ship-owning ports.

In Asia, Singapore and Calcutta possess about 30,000 tons each; but this tonnage is perhaps exceeded by some of the ports of China and Japan.

In our own country we find the tonnage of the United States as a whole is second among the nations of the world, having about 14 per cent. of the world's registered tonnage. But taken in comparison to our extensive sea coast, it stands relatively fifth in the list, having 4,117,000 tons of shipping, spread over a coast line of over 12,000 miles.

If we separate our coasts into two parts and adopt the system of calculation used for international statistics, we find that the Atlantic coast possesses 70 per cent. of the tonnage, and the Pacific coast 9 per cent., leaving 20 per cent., which is divided between the Northern lakes, 14 per cent., and the Western rivers, 7 per cent. The Atlantic coast may be divided into two parts, the northern and the southern, and we find that the northern coast, extending from Eastport to the Chesapeake, has about 90 per cent. and the southern coast 10 per cent. Moreover, we find that the New England States and Middle States together possess 63 per cent. of the whole tonnage of the country.

WOOD AND IRON TONNAGE.

A separation of the world's tonnage into two classes, those constructed of wood and those built of iron, shows that it is at the present time pretty equally divided in respect to register tons, but counting the number of vessels, the preponderance is still considerably in favor of the former. If we include only sea-going vessels of 100 tons and over in the estimate, we find that 52 per cent. of the tonnage of the world is iron-built and 48 per cent. of wood. But if we include only steam vessels, we notice that the proportion is quite different, over 90 per cent. of them being constructed of iron, while in the sailing tonnage only about 21 per cent. is iron and 79 per cent. of wood.

Taking the different countries separately we find that of the great maritime nations Great Britain possesses the most iron tonnage, although the proportion in some other European countries is about the same. The development of iron-ship building in Great Britain during

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the past half century, in which time it may be said to have increased from almost nothing to 86 per cent., is remarkable. If we include only the steam vessels built in the country, 97½ per cent. of their tonnage is now of iron, while of sailing vessels 67 per cent. of the tonnage is iron and 33 per cent. of wood.

In France the transition from wood to iron as a ship-building material has not been less rapid, although the development of French iron-built vessels has not reached such vast proportions as in England. Much of the French iron tonnage has been built abroad and purchased by French citizens. Taking the whole French marine into account, the proportion of iron tonnage is 77 per cent. to 23 per cent. of wood.

If we include only steamers of 100 tons and over, it is 99 per cent., and counting the sailing tonnage, it is 15 per cent.

If we go to Germany we find that ship-builders have followed in the path of England and France to a large extent, as 55 per cent. of the whole tonnage of the country is now composed of iron vessels and 45 per cent. of wood. Taking into account steamers alone of 100 tons, there is over 99 per cent. of the tonnage of iron and less than one per cent. of wood, while in sea-going sailing vessels 74 per cent. is still in wooden vessels.

Norway and Sweden are wood-producing states and naturally hang on to the cheaper material for use in their ship-yards. However, a great deal of iron shipping is now sailing under these flags, and it is found that the whole tonnage of the two countries taken together is now nearly one-half iron-built.

The proportion of the tonnage of steam vessels in these countries is now 75 per cent.

In the Russian merchant marine the proportion of iron tonnage is still less, being 30 per cent. of the whole. In steam vessels, however, the proportion is even here about 97 per cent., while of the sailing fleet the proportions are reversed, there being only 3 per cent. of iron.

Turning to the Mediterranean shores we observe that of the whole mercantile tonnage of Italy, which country is fertile of timber suitable for ship-building, about 77 per cent. of the shipping is of iron build.

Divided between steam and sail tonnage, about 99 per cent. of the former is of iron, and about 99 per cent. of the latter is of wood.

If we go to Spain we find the proportion of wood tonnage still holding out nearly as well, as 67 per cent. of the entire tonnage is of wood.

Taking steamers only, and sea-going tonnage into account, 88 per cent. is of iron, while only 2 per cent. of the sailing tonnage is composed of metal.

Although the countries of Europe show only a small difference in their preference for iron, the few wood-producing countries in the East having already less than half their tonnage of wood, it is not so with the rest of the world where the same facilities for working iron do not exist.

With us in the United States, for instance, 85 per cent. of the sea-going tonnage is still of wood, and over 90 per cent. if we include the lake and river tonnage.

Reckoning only sea-going vessels, the proportions of tonnage of steam vessels is 67 per cent. of iron, and 33 per cent. of wood.

Japan is the richest in tonnage of the so called semi-barbarous nations of the East, having a sea-going fleet of 102,000 tons, 52 per cent. of which was constructed of wood materials and 48 per cent. of iron.

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Distinguishing steam from sailing vessels in the estimate, she has of the former 72 per cent. of wood and of the sailing tonnage 98 per cent.

From these data we perceive that for the construction of steam vessels iron is almost universally the favorite material, and is fast crowding wood off the list. It may, I think, safely be predicted that within the next quarter of a century wooden steamers will become entirely extinct.

But if we confine the inquiry to sailing ships alone, it still remains a question as to which is the superior material for constructing them, and we may reasonably expect that wood will continue to be in demand for building the great bulk of the freight carriers of the world wherever a suitable quantity of timber is produced at a cheaper cost than iron, which in some localities will be as long as forests continue to grow.

CONDITION OF THE BRITISH MERCANTILE MARINE.

There appears to have been little or no change in the depressed condition of the shipping trade in Great Britain during the past year from that of 1884. All reports concur in confirming the truth of the statement that freights rule at a minimum rate, and ship-owners are receiving little or no profits from their vessels. But as this continuance of dull times has made people more cautious about investing in floating property, there is a falling off in ship-building, and it is hoped that the overproduction of British ship-yards will gradually be worked off and a return of prosperous times be ushered in.

A pamphlet recently published by a member of the London commercial firm, Messrs. Pinkney, Sons & Clare, gives a concise view of the British over-sea carrying trade, with statistics of steam and sailing tonnage, and remarks concerning the future prospects of the ship-owners there, from which I extract the following:

The serious depreciation in the value of shipping property during the last two years has induced us to inquire into the causes of it, and the following remarks by our senior resident partner are the result of studying statistics bearing upon the question. We have based our theory upon figures, and not sought to find figures in support of a theory; but as to whether the deductions we draw from them be correct or not, we must leave to the consideration of our readers.

We must premise that we write for those who have a foreknowledge of the facts of the decline in values referred to. We purpose to show that this result is brought about principally by low freights, although this is not alone due to a superabundance of tonnage, but is accentuated very largely by a decrease in the volume of available carrying trade for our ships. Our remarks, however, are chiefly applicable to cargo steamships, and not to those whose earnings may be supplemented by subsidies or by carrying passengers or mails.

We append some tables to justify these remarks, taken from the best authentic sources, and increase of tonnage is, of course, the primary factor in causing the depression under which the shipping interest is suffering.

The additions to the steam fleet of the British Empire (after deducting withdrawals) were as follows, viz:

	Tons, net register.
1880	216,013
1881	290,221
1882	331,575
1883	442,599
1884	235,765
1885	59,201
Total	1,574,374

If the sailing tonnage—which was reduced from 1880 to 1885, inclusive, by 590,536 tons—be deducted from the above total (at its usual equivalent to steam of one-third) we have a net addition of 1,377,529 tons, which we venture to think is much less than might have been expected from the large quantity built during the period in question; but this estimate of sailing tonnage is too low, and foreign tonnage ought to be taken into account also.

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If we analyze the above figures, we see that for the first three years the increase averaged per annum 279,269 tons; second three years the increase averaged per annum 245,855 tons; five years ending 1884 the increase averaged per annum 303,254 tons, and for the full period of six years the increase averaged per annum 262,562 tons, without taking into account the decrease as before mentioned of sailing tonnage, equal to about 40,000 tons per annum of steam tonnage.

It cannot be denied that an enormous increase remains, and that it does not take into account the large amount of tonnage built in the United Kingdom for foreigners, of which more hereafter. But what is perhaps less generally known is, how much of it went into large steamers.

An article in the Times, 26th December last, gives the figures as follows, viz:

Total tonnage of large steamers on British register.

Year.	2,000 to 2,500 tons.	2,500 to 3,000 tons.	3,000 tons and upwards.	Total tons.
1870	53,332	11,052	3,380	67,764
1880	214,293	94,340	32,551	341,184
1881	251,144	128,001	56,033	435,178
1882	286,813	169,016	72,111	527,940
1883	316,030	203,142	81,152	600,324
1884	329,020	230,624	100,567	660,211
Total	1,450,632	836,176	345,794	2,632,601

By the above it will be seen how the tonnage which went into these large steamers exceeds that of the total addition made to our merchant navy, as per the following table:

The steam tonnage of the British Empire, 1880 to 1885, *inclusive.*

[The figures for 1885 are taken from an article in the Times; the others are from Hansard.]

Year.	Net register tonnage.	Increase over previous years.
1880	2,949,282	216,013
1881	3,239,503	290,221
1882	3,571,078	331,575
1883	4,013,677	442,599
1884	4,249,442	235,765
1885	4,308,643	59,201
Total increase		1,575,374

Average of first three years	279,269
Average of second three years	245,855
Average of five years	303,254
Average of six years	262,562

So much so that even when losses and sales (which the writer of the article was probably unable to estimate) have been allowed for, it is evident that a very large proportion of the vessels added to the register exceed the usual size of cargo boats, and this was the case also as regards the tonnage added to foreign registers. Therefore much of it was evidently required for passenger space.

Still freights were tolerably well sustained until after the chartering season of 1883, and it was not until the heavy additions made to the register subsequently began to be felt, that they dropped to ruinous figures.

What helped to precipitate this drop is, we think, evident by looking to the volume of trade done during the decade ending in 1884; and as regards imports and exports, we wish to point out that with an increased supply of tonnage there was less demand for it.

A glance at the table appended will show that of eleven of the bulkiest and heaviest articles imported, comprising those which chiefly give employment to cargo steamers, the maximum importation was reached in 1883, being an increase of say 50 per cent. in seven years; and that, comparing the first quinquennial period with the second, the average annual increase amounted to the enormous figure of, in round numbers, 3,500,000 tons.

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Extract from the official returns relating to imports into the United Kingdom, 1875 to 1884, inclusive.

Articles.	1875 to 1879.	1880 to 1884.	Increase.	Decrease.
	Tons.	*Tons.*	*Tons.*	*Tons.*
Wheat, barley, oats, flour, &c	30, 908, 036	33, 042, 011	2, 133, 975	.....
Rice	1, 639, 523	1, 948, 849	309, 326	.....
Iron ore	4, 531, 672	14, 290, 147	9, 758, 475	.....
Pyrites of iron and copper	2, 782, 272	2, 992, 486	210, 214	.....
Linseed and rape seed	576, 365	689, 413	113, 048	.....
Sugar of all kinds	4, 974, 232	5, 665, 614	691, 382	.....
Currants and raisins	422, 748	393, 221	.....	29, 527
Cotton, raw	3, 169, 892	3, 828, 279	658, 387	.....
Esparto	849, 164	1, 267, 744	418, 580	.....
Flax, hemp, and jute	1, 747, 431	2, 200, 305	452, 874	.....
Wood:	*Loads.*	*Loads.*	*Loads.*	
Hewn, sawn, and split	28, 434, 110	31, 110, 189	2, 676, 079	.....
	Tons.	*Tons.*		
Mahogany	276, 147	233, 233	.....	42, 914

Yearly quantities.

Year.	Tons.	Year.	Tons.
1875	14, 204, 747	1880	19, 317, 207
1876	16, 135, 091	1881	18, 158, 178
1877	17, 617, 058	1882	20, 119, 710
1878	16, 343, 818	1883	21, 400, 596
1879	16, 010, 878	1884	18, 669, 800

	Tons.
Total yearly average of all the above articles for first five years	16, 062, 315
Total yearly average of all the above articles for second five years	19, 532, 293
Actual net increase during second five years	17, 349, 899
Net average yearly increase, period 1880–1884, compared with 1875–1879	3, 469, 978
Net increase of 1885 compared with 1884	1, 303, 369

Last year the elasticity of our trade was shown by an increase over 1884, of more than a million and a quarter tons, despite hard times.

The clearances (stated in register tons) during the decade, as per tables below, show a progressive increase (except in sailers, during 1884); but it is well known that many vessels leave with part cargoes, and it is almost impossible to estimate the weights and bulks of the large quantities of manufactured articles shipped; so that we rely for comparative purposes more upon cargoes brought inwards than upon clearances made outwards to indicate whether our carrying trade has more or less work to do; and more especially because manufactured exports always bear a certain proportion to the raw material of imports.

British and foreign steam vessels entered with cargoes only at ports in the United Kingdom.

Year.	British tonnage.	Foreign tonnage.	Total tonnage.	British percentage of total tonnage.
1870	5, 393, 251	738, 563	6, 131, 824	88
1875	8, 447, 109	1, 546, 167	9, 993, 276	84½
1880	12, 465, 991	2, 237, 379	14, 703, 370	84¾
1881	13, 019, 678	2, 336, 125	15, 355, 803	84¾
1882	14, 285, 079	2, 818, 914	17, 103, 993	83½
1883	15, 829, 577	3, 180, 022	19, 009, 599	83¼
1884	15, 431, 589	3, 140, 006	18, 571, 595	83

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British and foreign sailing vessels cleared from ports in the United Kingdom with cargoes only to foreign countries and British possessions.

Year.	British tonnage.	Foreign tonnage.	Total tonnage.	Percentage of British tonnage.
1870	5, 502, 336	3, 966, 784	9, 469, 120	58
1875	4, 308, 341	4, 096, 137	8, 404, 478	51¼
1880	4, 281, 717	3, 983, 267	8, 264, 984	52
1881	3, 893, 148	3, 794, 828	7, 687, 976	50½
1882	3, 806, 900	3, 840, 062	7, 646, 963	49¾
1883	3, 294, 717	3, 340, 900	6, 635, 617	49¾
1884	2, 981, 022	2, 975, 115	5, 956, 137	50

The great shrinkage in our trade since 1883 necessarily caused less steam tonnage to be employed, and had it not been that cheap freights induced a demand for steamers in what we, for want of a better term, may call the outside trades of the world, still less would have been employed than was the case. And here, perhaps, it may be pardonable to digress, and point out how these outside trades absorb, not only much of the surplus tonnage on our register, but also of that which swells the figures of our building yards beyond what we register ourselves.

In the first place we no longer see wooden vessels built, equipped, and manned, in ports all over the country and abroad, wherever cheap materials and skillful labor were procurable; and the poetry of ship-owning has gone so far as the traditions attached to the locally built ship and her officers and crew (most of whom were personally known to the owners) are concerned. The great yards in the North have changed all that, so much so that the build of foreign steamers seldom betrays their nationality nowadays; whilst the carpenter and sailmaker have been, to a great extent, superseded by workers in iron, and engineers and cargo steamers with local crews are scarcely known. Our transatlantic cousins, owing to their protective policy, no longer race us in the tea trade with a fast "Result" or send over a "Great Republic" to carry more than our biggest sailing vessels. Nor do stout Dutch Indiamen load on the berth in London for our colonies. In fact the whirligig of time has brought its revenge, and we now build and carry largely for those nations who carried a good deal for us a generation ago.

It is not to be wondered at that modern improvements (especially decreased consumption in fuel) should cause steamers to increase, and sailing vessels to decrease so rapidly. The power of the one to go in the teeth of gales keeps improving, and the low percentage of absolute efficiency got out of the consumption of a given quantity of coal shows how much the steam-engine is capable of improvement, whilst the capability of a sailing vessel to lie close to the wind was reached years ago. It is therefore evident that steamers must absorb more and more of the carrying trade of the future to our benefit.

For our wealth in iron, coal, and ship-building plant, and our national energy, have given us predominance in this trade, and with cheap freights, and certainty and quickness of transport by steam, we stimulate the shipment of fruit and ore from the Mediterranean and the West Indies, coffee from the Brazils, and seeds from India, to the United States; and a large proportion of the export tonnage of North and South America is in our hands also. We carry Russian rails from the Baltic to the Black Sea, and salt back again to Russia. A considerable portion of the Baltic wood trade to France has recently fallen to our steamers; also the wine France imports from the Mediterranean, and her oil-seeds from India. The wool going into Antwerp from the River Plate, and the grain, cotton, &c., shipped from India to continental ports are mostly carried by us. We have knocked out the native-built "country" ships from the India coasting trade, and the clumsy junks and fast-sailing opium clippers in Chinese waters, are being superseded by our steamers. In fact, we might amplify the list greatly, but the foregoing are enough to show where steamers are extending outside trades, in which sailing ships were mostly employed, and in many cases creating new ones also, the appetite growing by what it feeds upon.

Indeed, cheap freights, like a universal third-class on the railways in this country, cause a vastly increased demand for transport, and this demand no doubt will not be checked to any appreciable extent by such a rise in rates as would pay owners a fair dividend, and perhaps it is the increasing facilities in obtaining steamers anywhere, and at nearly all shipping seasons, which had something to do with our large imports before 1884, and our diminished ones since.

For just as ship-building and owning have changed, so have the *rôles* played by our merchants. With a superabundance of cheap tonnage they were at first inclined to take advantage of it, and go upon old lines and import too freely. But they soon

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awoke to the fact that the man who speculated ahead and bought a stock for a season's trade, had no longer the chance of reaping a large profit by his prescience, for it has become unnecessary to secure tonnage a long way in advance, steamers being now so plentiful that by telegraphing orders, produce can be delivered in Europe from the extremity of the globe in a time measured by weeks rather than months. Steamers go earlier and later than sailing ships to ports ice-bound in winter; and lately the tendency has been to defer rather than anticipate chartering. Still even abstention therefrom may be pushed into extremes; and we hope to show further on that the time is approaching when operations will be resumed more actively than last year.

And whilst upon this point and with reference to table subjoined, we beg to call attention to the United States ore trade; how it declined contemporaneously with that of our imports in 1884; and to mention as a sign of the times that the chartering in it for the first two months of this year exceeded 200,000 tons. This, perhaps, as we take leave of the past, we may remark is one of the most encouraging signs as regards the future.

Iron ore imported into the United States.

Whence.	1880.	1881.	1882.	1883.	1884.	1885.
	Tons.	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*
United Kingdom	91	77	49	25	7	12
Europe, chiefly Mediterranean	392	551	524	556	519	346

THE FUTURE.

Respecting which the chief questions seem to us to be, when are we to see the importations of 1883 resumed and increased? and when will the tonnage either decrease to what was required then, or find more employment to absorb it through progression in trade? And as regards the first, we think it is sufficient to point out the increase during 1885, of 1,303,369 tons, as per foregoing tables.

It is unfortunate that we cannot point to a similarly recorded change in exports, although we believe, from inquiries made to us for vessels, that more iron will shortly be shipped to the United States; whilst New Zealand, Burmah, and India are taking now, and will need in the future, very large supplies, and it may be China also. Still we cannot ignore the fact that shipments of rails, as the exports of iron and steel rails from the United Kingdom were 778,414 tons in 1883, 543,215 tons in 1884, 497,341 tons in 1885, and have fallen off considerably, and that the stock of pig iron is very large.

If we only saw more impetus given to the iron trade, we should know that many others would follow, as in 1879, although of course we cannot expect to see it come from ship-building as then. Exports of coal have as usual increased.

Exports of coal, coke, cinders, and fuel from the United Kingdom.

Year.	Tons.	Year.	Tons.
1870	*11,702	1882	20,934
1875	14,544	1883	22,775
1880	18,719	1884	23,350
1881	19,587	1885	23,767

* Quantities stated in thousands of tons.

But the stocks of our greatest carrying trade, viz, grain, are low, and indications are abroad that a demand in it must soon arise. In fact during the second and third weeks of March, improvement has already been manifested in American and Indian freights, affected by large sales of grain and seeds, and it is known that the chief stocks of cereals in the United Kingdom, as shown in the table, and the acreage of wheat sown, are decreasing, whilst a dry summer demands increased importation of fodder.

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Stocks of wheat, barley, oats, flour, and maize at London, Liverpool, Gloucester, Bristol, Hull, Newcastle, Glasgow, Leith, Dublin, Belfast, &c. (From Dornbusch.)

Date.	Wheat.	Barley.	Oats.	Flour.		Maize.
	Quarters.	*Quarters.*	*Quarters*	*Sacks.*	*Barrels.*	*Qrs.*
Jan. 1, 1884	1, 669, 604	398, 738	722, 107	665, 086	20, 076	63, 17[illegible]
Jan. 1, 1885	2, 995, 206	359, 202	496, 194	998, 507	25, 186	305, 742
Jan. 1, 1886	1, 558, 123	337, 603	617, 318	606, 692	13, 165	67, 596

The stocks of bonded goods do not call for special remark.

It cannot, therefore, be denied that stocks are working down, and it is stated that 500,000 tons less beet sugar will be made on the continent this season, which ought to give that much extra need for tonnage to carry tropical growths.

Wood goods have not fallen off like many other imports, but the demand for them continually increases. The stocks in London are rather larger than last year.

The figures in our tables tell their own tale pro and con, but whilst more tonnage is likely to be wanted for the articles imported, the stock of iron will not cause a diminution in the tonnage required (except for coasting purposes), but, on the contrary, it is there ready for conversion into manufactured articles, should a sudden demand from abroad arise for them, while that of transport will come as its natural sequence.

If, however, there should be any doubt that increased demand will soon set in and create better freights, we think there can be no question that decreased tonnage will work the same effect; but as we have tried to indicate how lessened trade and increased carrying power caused ruinous effects, so now we hope to show the converse of that proposition.

The figures of the Répertoire Générale are made up to May, 1885, and those of our Registrar General to December, 1885. We adopt them because they give the sailing tonnage of the world, and they show that the steam tonnage of 1885-'86 exceeded that of 1884-'85 apparently only by 43,833 tons; for as an increase in British of 88,743 tons is shown, whereas by table, brought down later, it should be only 59,201 tons. We have, therefore, to deduct a difference of 29,542 tons, leaving an increase of only 14,391 tons; but if we take off an average year's decrease of universal sailing tonnage, as per table (thirded), say 55,913 tons, the increase ceases and becomes a decrease equal to 41,622 tons of steam.

We have no figures to prove that the foreign losses have decreased since the figures of the Répertoire Générale were compiled last May, but that it must be so is evident by the steady decrease in carrying power by sailing vessels; and as regards steamers, as the percentage of foreigners has increased so little (say 1¼ per cent. only), it is probable that their losses rank proportionately with our own.

The latter for January, by the Registrar-General's returns, show—

	Tons.
British and colonial sailers removed from register	26, 308
British and colonial sailers added	10, 667
Decrease	15, 641
Allow as equivalent to steam, say	5, 213
And deduct net increase of steamers	651
Leaves a net decrease equal to steam tonnage of	4, 562

The February returns show—

British and colonial sailers removed	17, 671
British and colonial sailers added	10, 032
Decrease	7, 639
Allow as equivalent to steam, say	2, 546
And add net decrease of steamers	1, 605
Actual decrease	4, 151

And it is well known the losses in March have been heavy.

If, therefore, we could get the foreign losses, we should no doubt find that the available carrying power of the world is less now than at the corresponding period of last year. If also we take into account the increased proportion of passenger steamers,

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not forgetting the amount of steam tonnage going into tugs, fish-carriers, &c., we shall see that cargo steamers have much better prospects before them than last year. Then we are met by the remark that there are still far too many of them (which is unfortunately too true), also that they are suffering too much from foreign competition, respecting which we have done our best to get particulars as to how it affects us generally.

As to sailing vessels, foreign tonnage compared with British has increased from 60½ per cent. to 63¾ per cent. in six years, while we owned 62¾ per cent. of universal steam tonnage in 1880–'81, reached our maximum of 63¾ per cent. in 1884–'85, and dropped to 62 per cent. in 1885–'86.

Then, as to the alarmists who have told us what formidable competitors the French were to be by their bounty system? It will be seen by the tables how little, in comparison to ours (except in 1882), are the additions to the French navy and how large the proportion of French tonnage using the Suez Canal is employed for state purposes; whilst as to French competitions generally, it is well known that some steamers purchased two and three years ago have been resold to English owners at more than 40 per cent. depreciation, proving that French ship-owning (like German sugar-growing), which demands bounties for nourishment, cloys itself with them to disgorging point and ruins what a naturally increasing and healthy appetite would otherwise digest perfectly.

It is, however, perhaps neither the Germans nor the French whom we have to fear, but if the United States Senate passes the bill, whose introduction they have approved of, to purchase foreign tonnage for foreign trades, we may look to see sturdy rivalry from our American cousins, who have given us before now so many ideas as to practical improvements in ship-building. If we have improved upon such in turn, we must not forgot them, especially as regards their types of river steamers and yachts.

There remains, then, the question whether this foreign competition is not healthful for us by stimulating our energies to the utmost? If we are handicapped by acts of Parliament more stringent than those of the foreigners, we still show our proud pre-eminence in the long trades of the world, as shown by the following tables:

British and foreign sailing vessels entered with cargoes only at ports in the United Kingdom.

Year.	British tonnage.	Foreign tonnage.	Total tonnage.	British percentage of total tonnage.
1870	4,915,701	3,863,217	8,778,918	56
1875	4,405,242	4,641,410	9,046,652	48¾
1880	4,552,020	4,737,890	9,289,910	49
1881	3,844,990	4,023,915	7,868,905	49
1882	3,525,301	4,185,755	7,711,056	46
1883	3,356,477	3,944,242	7,300,719	46
1884	2,777,647	3,347,443	6,125,090	46⅛

British and foreign steam vessels cleared from ports in the United Kingdom with cargoes only to foreign countries and British possessions.

Year.	British tonnage.	Foreign tonnage.	Total tonnage.	British percentage of total tonnage.
1870	6,431,751	813,067	7,244,818	88¾
1875	10,146,648	1,862,613	12,009,261	84½
1880	14,580,140	2,834,546	17,420,686	84
1881	15,712,384	2,936,333	18,648,717	84
1882	16,585,726	3,466,174	20,051,900	82¾
1883	18,840,945	3,896,598	22,737,543	83¾
1884	18,965,648	4,351,877	23,317,525	81¾

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Vessels entered and cleared in British India (exclusive of native-owned tonnage, averaging about 1,400,000 tons yearly, and nearly all employed in coasting trade).

Year.	British tonnage.			Foreign tonnage.			Percentage of British tonnage.
	Ocean trade.	Coasting trade.	Total.	Ocean trade.	Coasting trade.	Total.	
1880	4,403,260	8,777,972	13,181,232	687,862	277,732	965,594	93¼
1881	5,119,860	9,265,641	14,380,501	743,742	265,896	1,009,638	93¾
1882	5,856,677	9,194,926	15,051,603	920,510	193,051	1,114,011	93
1883	5,366,770	10,687,631	16,054,401	1,168,293	273,336	1,441,629	92
1884	5,568,676	11,413,412	16,982,088	1,162,022	354,862	1,516,884	91¾

Total steam tonnage from 1848 to 1853.

Years.	Tons.	Years.	Tons.
1848	33,891	1851	45,912
1849	29,217	1852	66,889
1850	45,407	1853	109,711

These prove that between 91 and 94 per cent. of the Indian carrying trade is in our hands, and more than 76 per cent. of that passing through the Suez Canal also. Nor must it be forgotten that the percentage of our tonnage going to Australasian waters around the Cape exceeds that of foreigners. Are not these percentages sufficient to silence any croakers as to our decadence at sea? What signs do they show of it? Are we to suppose that the descendants of Americus and Columbus, of Van Dieman, Behring, Hendrik Hudson, and others whose names enrich cartographical nomenclature, like those of Raleigh, Drake, Cook, and our host of more modern globe-scudders, are going to let us have all the trade of the world, any more than we let them have it when nature favored their ship-building operations as it now favors ours? It is hardly likely, and we shall have to battle against their competition in the future as in the past, turning to account any improvements we may inaugurate, whether in tri-compound or quadruple cylinder engines, liquid fuel, steel construction, or otherwise—when found economical and practical—to assist us to win the race.

The percentage of increase in foreign tonnage is to some extent alarming, but it must not be overlooked that as regards Germany, for instance, with 101 per cent. of increase in six years, her whole steam tonnage for 1885–'86 is less than was added to the British register in 1883 alone, and much of it has no doubt gone into subsidized lines for political purposes, and does not therefore enter very much into competition with our cargo steamers, whilst "*ex uno disce omnes*" may be applied to a good deal of the rest.

Anyhow, despite the remarkable increase in percentage of Northern European and French steam tonnage, our proportion of that of the world keeps pretty much of the same, and the alarm vanishes when that is kept in view. It must also be borne in mind that we gain somewhat in carrying power by the increased speed and lessened consumption of our steamers, as the per contra of lessened percentage on the register, but perhaps our extra capacity for work is shown better by taking the statistics of a port like Antwerp, where foreign tonnage enters freely into competition with us.

In conclusion we wish to say one word as to the laid-up tonnage, and we cannot blink the fact that there is far too much of it. A good deal of this may be accounted for by the lateness in European chartering this season, but when it does commence it is probable that more competitors being in the field at once for boats will enhance freights the more. Still they cannot be enhanced much until this tonnage is absorbed, only it must be borne in mind that much of it is now in stronger hands and will not be worked unless at a profit.

And although new tonnage is very cheap, and will pay where some of older build will not, it is not likely we shall have companies formed in a hurry to start steamers like some of those which have broken up lately. It has been reckless competition by inexperienced, managers who were willing to take charters drawn so artistically that the gross freight was nearly whittled away by exactions (as the shareholders found to their cost when they saw the net result), which has been worse for old established ownerships than foreign competitors; and now this has ceased, it is to be hoped that the time for remunerative dividends has come.

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Net tonnage of steam vessels passing through the Suez Canal.

Flag.	1883.		1884.		1885.		Total.	
	No.	*Tons.*	*No.*	*Tons.*	*No.*	*Tons.*	*No.*	*Tons.*
American	1	788	4	5,498	3	1,350	8	7,636
French	272	557,088	300	567,874	294	573,645	866	1,698,607
German	123	156,724	130	163,903	155	198,841	408	524,468
Scandinavian	20	25,904	18	24,235	33	40,177	71	90,316
Other nations	354	629,263	358	638,052	405	657,680	1,117	1,924,995
Total foreign nations	770	1,369,767	810	1,404,562	890	1,471,693	2,470	4,246,022
British	2,537	4,406,088	2,474	4,466,930	2,734	4,864,048	7,745	13,737,066
Percentage British tonnage	.....	76½	.....	76	.....	76½	.....	.....

Proportion of the above passing through in 1885.

	English.	French.	Other nations.	Total.
	Tons.	*Tons.*	*Tons.*	*Tons.*
Government ships	107,164	145,642	54,111	306,917
Government hired transports	232,148	102,509	19,707	354,359

Tonnage built at home, bought abroad, and sold to other nations, being additions only to the French fleet.

Years.	Vessels built.	Vessels bought abroad.	Vessels sold to foreigners.	Actual remainder.
	Tons.	*Tons.*	*Tons.*	*Tons.*
1875	37,520	20,001	14,722	42,799
1876	32,707	15,581	16,148	32,140
1877	26,884	12,864	14,751	24,997
1878	21,867	19,677	12,851	29,193
1879	24,733	16,809	8,323	33,219
1880	12,269	34,201	12,939	33,531
1881	20,735	34,909	11,441	44,303
1882	56,594	78,612	17,407	135,206
1883	35,223	49,387	14,681	69,929

NOTE.—Hansard does not state if losses, &c., have been taken into account.

SUMMARY.

We trust, therefore, that our statistics will bear out the deductions we draw from them as follows, viz:

(1) That the carrying capacity of the world is about the same as last year, and that much of its increase during the last six years has been for other than cargo-carrying purposes. Also that it is decreasing fast.

(2) That importations are increasing largely, taking a fair average of one quinquennial period against another, and that these, with additional exports, will not only do a good deal towards making the demand for vessels soon exceed the supply, but that the increased demand in outside trades will do more. Also that the lowness of home stocks show imports in 1886 are likely to exceed those of 1885 more than the latter exceeded those of 1884.

(3) That foreign competition is not to be dreaded to any great extent, nor reckless additions to be feared at home.

All these causes tend one way, viz, to make ship-owning pay. And that is its *raison d'être*. It has been made to pay after previous crises, and it will be made to pay again. Perhaps the present trial we are passing through is merely "the darkest hour preceding the dawn" of renewed prosperity.

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SHIPPING OF FRANCE.

The growth of the mercantile marine of France has been watched with considerable interest since the adoption of the bounty law, the provisions of which were set forth in my last annual report.

During the first year after the adoption of the law referred to, 161 steamers of 122,276 tons and 1,059 sailing vessels of 39,733 tons were added to the French mercantile marine. In subsequent years, however, the increase in tonnage has been less marked, owing, it is said, to the utter lack of inducement to invest in shipping. The stagnation in the foreign trade of France, like that of other nations, renders investments in floating property unremunerative. According to the "Liste des bâtiments de la marine Française," published by the French Government January 1, 1886, there are 3,397 vessels of 50 tons and upwards belonging to the merchant marine, besides 254 yachts, comprised as follows:

Class.	1885.		1886.	
	No.	*Tons.*	*No.*	*Tons.*
Steamers	633	513,118	613	.....
Sailing vessels	2,669	507,104	2,774	.....
Total	3,302	1,020,222	3,397	.....

But a comparison of the volume of the foreign trade of France performed by French vessels might be expected to show more definitely the effect of the bounty upon the shipping trade of the country. The tables below give the arrivals and clearances of vessels under the French flag and their tonnage at the different ports, and show the increase or decrease of the over-sea trade performed in national bottoms.

Table showing the volume of trade in French vessels.

ARRIVALS.

Trade at French ports with—	1881.		1882.		1883.		1884.	
	No.	*Tons.*	*No.*	*Tons.*	*No.*	*Tons.*	*No.*	*Tons.*
French colonies	1,437	990,180	1,489	1,024,375	1,569	1,030,989	1,383	1,010,577
Sea fisheries	456	54,212	504	58,939	585	64,664	628	72,575
European foreign countries	7,291	2,111,269	6,792	1,988,971	6,792	2,049,935	5,526	1,990,605
Countries beyond Europe	767	763,961	783	950,732	879	1,165,411	793	1,107,819
Total	9,951	3,919,662	9,568	4,023,017	9,759	4,410,999	8,430	4,181,576

CLEARANCES.

Trade at French ports with—	1881.		1882.		1883.		1884.	
	No.	*Tons.*	*No.*	*Tons.*	*No.*	*Tons.*	*No.*	*Tons.*
French colonies	1,625	1,112,094	1,690	1,102,092	1,793	1,273,278	1,691	1,257,042
Sea fisheries	383	42,198	499	57,104	549	57,744	000	65,017
European foreign countries	5,297	1,319,209	4,933	1,369,113	5,059	1,536,790	4,445	1,502,616
Countries beyond Europe	821	881,414	842	1,056,844	895	1,221,824	759	1,094,582
Total	8,126	3,354,915	7,964	3,585,153	8,296	4,089,636	7,495	3,919,257

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It would appear that the object of the French Government in granting bounties to vessels, either built in France of domestic materials, or by French builders, or abroad on French account, has so far been a failure, being apparently insufficient to overcome the advantages held by England in a season of poor freighting business.

The general dullness of the carrying and foreign trade at the time of the introduction of bounties was felt in France in common with other countries, and it was to stimulate both those trades, in French interests, that Government aid was proffered.

Political economists had viewed with concern the decline of the French marine, and the lack of profitable employment for French shipping; and in their search for some means to infuse energy and revive traffic on the ocean, bounties were proposed as a specific to enable French owners to compete with the world for a larger share of its foreign trade.

The owners of French vessels on which bounties were paid were presumed to be in a better position than others, and they expected a great increase in the foreign trade of France by the opening of new markets for French goods, or the creation of a large demand for them in the old, with a consequent increase of the tonnage of France. But the result of a trial of five years seems to show that by the multiplying of vessels in France, when the world's tonnage was in excess of the actual demands for shipping, a speedy remedy for the disease has not been found. The failure of the results anticipated demonstrates that the principle involved does not meet the wants of the case. Because French steamships stand ready to carry freight at a less cost than others, as it is claimed, it does not follow that the freight is at hand to be carried. Nor does it follow that because French cargoes may be ready to be put on board French steamships built for the bounty, foreign merchants are waiting to purchase or exchange foreign products for such French cargoes, when the merchant navies of the world have hitherto carried on the trade and still keep possession of the markets.

It has also been found that French orders for steamships may be filled cheaper in England than in France, and French owners of English-built steam vessels have been satisfied with half the bounty paid by the French Government under such circumstances.

Only a certain number of steamships are wanted for certain lines of traffic, and these lines of trade being already mostly in possession of the English, it will probably take years before they can be displaced by new beginners, even although competing with all the advantages of aid from the Government.

The advantage enjoyed by transient cargo steamers and sailing vessels should, however, be more apparent than it is, although the times have been quite as favorable for the experiment.

FRENCH MAIL SUBSIDIES.

The French Government have introduced into the Chamber a bill ratifying an agreement made by it with the Compagnie des Messageries Maritimes for the carriage of mails. The steamship lines of this company, subventioned by the state, may be classed in five groups, namely, the Mediterranean, the Indo-Chinese, the Brazils and River Plate, the Australian, and the East African. According to the new agreement, only one of these groups, the East African, will receive an increased subvention, while in the other cases a more or less pronounced reduction has been made. In the Mediterranean group the line from Marseilles to Constantinople and the circular route to Syria

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will cease to run the present itinerary for this group, consisting of a line running from Marseilles to the Piræus and Smyrna, another between Marseilles, Alexandria, and Beirut, and a line from Port Said to Salonica and Smyrna. The working of this last line will be watched with interest, as it is proposed to make Salonica take the place of Brindisi for the Indian mail service.

The Indo-Chinese group is by far the most important of the lines subventioned, absorbing more than half the total amount paid by the Government. In this group the alterations are not so marked. A subsidiary line running from Hong-Kong to Yokohama will cease to work, as the steamers of the main line will go direct to Yokohama instead of stopping at Shanghai, as at present, and a new subsidiary line will be formed from Aden to Kurrachee and Bombay. The lines in this group will then consist of the main route from Marseilles to Japan, via India, the Straits and Hong-Kong, and three subsidiary lines, the first from Aden to Kurrachee and Bombay, the second from Colombo to Calcutta, via Pondicherry and Madras, and the third from Singapore to Batavia.

Owing to the number of private lines now running between France and South America, the Brazils and River Plate line has been reduced from a fortnightly to a monthly service. The mails will continue to be dispatched fortnightly, the second departure in the month being intrusted to a non-subventioned line. The subsidized line will continue to run from Bordeaux to Buenos Ayres, via Lisbon, Dakar, Rio, and Montevideo.

The Australian group has had its routes entirely remodeled in consequence of the sharp competition met with from English and German lines. Under the present arrangement, owing to vessels on the main route having to call at the Seychelles, Réunion, and Maurice Islands, forty-three days are required in the voyage from Marseilles to Melbourne and Sydney, whereas the English and German lines are able to do the journey in about thirty-eight days. To remedy this state of things the service has been reorganized, and the main line will proceed from Marseilles to the Seychelles via Suez, and thence direct to Australia. A subsidiary line will be formed from the Seychelles to Réunion and Maurice, and a direct line from Marseilles to Réunion and Mauritius via Zanzibar and Tamatave.

In the case of the East African service, the total amount of the subsidy, as we have stated, has been increased, but it is important to note that the amount per mile run will be less, thus showing that the Government will require the company to perform more work. The following table shows the amount of the existing subsidies and the subsidies proposed in the new agreement, and also the amount paid per marine league run at present, as against that proposed to be paid:

Service.	Amount of subvention under existing agreement.	Amount of subvention under new agreement.	Amount paid at present per marine league run.	Proposed amount to be paid per marine league run.
	Francs.	*Francs.*	*Francs.*	*Francs.*
Mediterranean	2,609,595	1,050,929	17.80	14.80
Indo-Chinese	7,736,544	6,712,000	38.77	32.09
The Brasils and River Plate	1,772,668	878,904	17.80	17.80
Australian	3,283,904	3,079,104	32.00	30.70
East African	361,400	1,042,561	25.00	20.00

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THE RUSSIAN MARINE.

That the Empire of Russia, with an extent of territory forming about a sixth of the habitable globe and a population of 100,000,000, has a comparatively insignificant merchant navy is probably owing to two reasons:

First, because they have been to a considerable extent shut out from the great navigable oceans, the Euxine having been for so long regarded by the great maritime powers of Western Europe as a closed sea, while the Baltic is practically so by ice for a considerable portion of the year, leaving to her only the ice-bound Arctic for a sea-coast.

Second. Her people have not in the past taken naturally to the sea. Of late years, however, there is evidence that Russia is beginning to appreciate the great value of a mercantile marine, and efforts are being made to develop her maritime trade.

According to the Louvorine Calandar, the aggregate number of vessels in all the Russian seas amount to 3,296, measuring 213,416 tons, of which 248, of 70,056 tons, are steamers. There has been quite a number of steamers built in the ports of the Black Sea with a view to being used in time of war for transports and cruisers. The Government, with a view to encouraging trade, has guaranteed liberal subsidies to some of these steamers.

The Russian Steam Navigation and Trading Company, which was started in 1857 with 18 steamers, has received up to this time about $15,000,000 in subsidies. At the present time the company owns about 80 steamers and receives a yearly subvention of about $402,000. As the fleet of this company increased, so it extended its communications to every port in the Black and Azof Seas, as well as branching out into the Mediterranean, Atlantic, and the North Sea.

When the Suez Canal gave the opportunity this company sent out steamers to China, India, and the North Pacific. Other Russian steam companies, viz, the Caucasus and Mercury Company, the Ameer Company, the Prince Gagarine Company, and the Archangel Mourmon Company, are subsidized to the aggregate amount of $330,000 per annum, so that the total of annual subsidy paid by the Russian Government is about $731,765.

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PERFORMANCE OF WOOD AND IRON SHIPS.

In continuation of the plan inaugurated last year, to ascertain the relative performance of vessels built of wood and iron, I subjoin a table showing the reports of damage received on the passage to grain cargoes, and condition of the same upon its discharge at the port of Liverpool. The list embraces one hundred and twenty wooden and iron ships, which loaded at the ports of California or Oregon, in the year 1885. The record of passages is not given in all cases, but taking an average of those known it amounts to one hundred and thirty-nine and a quarter days for the wooden ships and one hundred and forty and a half days for the iron ships. The averages were considerably lengthened by disasters to three of the iron and one of the wooden ships, all of which were over three hundred days on the voyage, sixty of these ships being wooden and sixty of iron build. By classifying the cargoes in the five different categories, made use of by Consul Russell in his report from Liverpool, we are able to get at an accurate knowledge of the comparative safety of cargoes taken on a long voyage in ships built of the two classes of material. The consul closes his letter to the State Department in the following words:

I have found some difficulty in ascertaining the information. I am sorry to say the inclosure in its present shape is not complete, there being probably twenty or thirty ships more to be added; but, on account of the merchants refusing to furnish the information, I am obliged to send it as it is. I have no doubt, however, that the information will be sufficient to assist the honorable Secretary of the Treasury in determining whether or not grain can be carried in wooden ships in the trade between the Pacific coast and Europe as safely, speedily, and economically as in vessels built of iron.

Table of relative performance of 120 *grain-ships leaving the Pacific coast for Liverpool, England, in the years* 1884–'85.

Condition of cargoes.	Iron.	Wood.
Cargoes landed in excellent order	8	20
Cargoes landed in very good order	32	28
Cargoes landed sound	15	8
Cargoes lightly damaged	3	3
Cargoes badly damaged	2	1
Total	60	60

FREEBOARD.

Various formulas were incorporated in my last annual report for ascertaining a safe freeboard for use by vessels in different trades. Since then the tables recommended by the British load-line committee, appointed by Parliament to investigate and report upon the subject, have been formally adopted by the British Board of Trade.

The rules expressed in these tables are stated to have been in successful operation for over a year in the British merchant marine, and the British Government is now making overtures to the various maritime Governments with a view to their adoption generally. The Board of Trade has power under the rules, to detain foreign ships over loading in British ports, but the power has been exercised only so far as British ships were concerned, the board deeming it advisable to come to

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some understanding with other Governments as regards the depths to which all merchant vessels may be loaded when leaving port, before enforcing the rules as to foreign ships.

This office has under consideration a request by the British Government, for the expression of an opinion by the Government of the United States as to the applicability of the rules and tables to merchant ships sailing under the United States flag. The question is somewhat complicated, and will receive careful consideration.

Heretofore masters of American vessels have fixed their own load-line, and in the case of wooden American vessels it seems to have generally been a safe one. A rule upon the subject, however, binding upon all concerned may, it is thought, be conducive to the safety of the vessel, cargo, and crew, while there would necessarily result a considerable gain in the bulk of tonnage required if all over-loading could be prohibited.

COLLISION.

In maritime navigation collision means the act of two vessels coming into contact with each other, one or both being more or less injured by the shock. Collision may be caused either by the fault of one or both of the parties, in consequence of carelessness, lack of skill, imprudence, or negligence, and is sometimes brought about by the force of the wind or current, by the agitation of the sea, &c., causing the anchors to drag, as well as by false maneuvers in navigating; but it most frequently happens in the darkness of the night, or at times when the vessels are enveloped in thick fog.

The "dangers of the sea" are proverbial, but many of the disasters that are so frequently recorded might have been averted. Among them, those caused by collision appeal in the most eloquent language for the attention of all maritime people. According to the British Board of Trade returns of collisions between British and foreign vessels in the seven years prior to 1884, the cases of total losses were six hundred and forty nine, with a loss of seven hundred and sixty-two lives.

An inquiry held into the causes of these collisions which resulted in so much damage to property and loss of life, leads to the following conclusions:

CAUSES OF COLLISIONS, 1877-'84.

Neglect or misapprehension of steering or sailing rules	128
General negligence and want of caution	102
Bad lookout	92
Cause unknown	85
Fog and thick weather	58
Error of judgment	53
Neglecting to show lights	48
Inevitable accidents	29
Parting cables, dragging anchors, and fouling	27
Error of pilot	11
Want of sea room, crowded navigation	9
Want of seamanship	4
Anchoring in foul berth	2
Missing stays	1
	649

The disasters to American vessels are nearly in the same ratio; but

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it is believed that many unreported cases of collision occur in which no lives are lost, and where the damage is slight, or adjusted without recourse to the law.

The number of disasters at sea from collisions has increased of late years, so that it is now conceded to be one of the greatest perils that ocean traffic is liable to. It is therefore of great importance to the safety of life and properly on the sea to introduce such legislation as will tend to lessen this risk, and to enforce rules to determine the amount of damage in such cases, and by whom the losses should be sustained.

In respect to the first proposition, viz, additional legislation to lessen the risk of collision, various enactments and regulations have been promulgated from time to time by the governments of maritime countries, all recognizing the same general principles; but much must depend on the prudence and watchfulness of the navigators themselves. There must be a lookout on board, properly stationed and qualified for the work; and the absence of such a lookout is rightly regarded as evidence of negligence. Strict obedience to all rules requiring the exhibition of lights and the employment of fog-signals is also demanded; and a vessel coming into collision with another at night, not having the proper lights burning, would be adjudged as at fault.

It was early understood that the value of any regulations in regard to the navigation of vessels and the display of lights and signals used at sea would depend upon their acceptance by all commercial nations, and those which from experience were found necessary to the safety of the commerce of the world have been systematized and embodied in the Revised International Regulations for preventing collisions at sea; a reprint of which will be seen on the appendix to this report. These international regulations have been generally adopted, and are known as the "rules of the road" on the high seas by the following countries: Austria, Hungary, Belgium, Chili, Denmark, France, Germany, Great Britian, Greece, Holland, Italy, Norway, Portugal, Russia, Spain, Sweden, and United States.

Although practically adopted by our navigators some years ago, the revised international regulations were not legalized by act of Congress until March 3, 1880.

The law approved that day provides that the regulations referred to "shall be followed in the navigation of all public and private vessels of the United States upon the high seas and in all coast waters of the United States, *except such as are otherwise provided for.*"

The repealing clause, which concludes the act, provides, "That all laws and parts of laws inconsistent with the foregoing" Revised International Rules and Regulations "for the navigation of all public and private vessels of the United States upon the high seas, and in all coast waters of the United States, are hereby repealed, except as to the navigation of such vessels within the harbors, lakes, and inland waters of the United States."

There has arisen some doubt as to the correct limit or domain of the new rules. The phrase "*such as are otherwise provided for*" in the enacting clause has been (erroneously, I think,) construed to imply that the old rules embodied in the Revised Statutes (section 4233) were still in force in certain localities, and the language of the repealing section cited above prescribes that the rules of local authorities may have precedence in all *harbors, lakes, and inland waters.* It is suggested that a clearer definition of the intent of the law might be given by simply re-

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pealing section 4233, and embracing all harbors frequented by vessels employed in ocean navigation in the scope of the Revised International Regulations.*

Of the different circumstances under which a collision may occur and by whom the loss must be borne, a competent judge has said:

There are four possibilities under which an accident of this sort may occur:

In the first place, it may happen without blame being imputable to either party, as where the loss is occasioned by a storm or any other *vis major*. In that case, the misfortune must be borne by the party on whom it happens to light, the other not being responsible to him in any degree.

Secondly, a misfortune of this kind may arise where both parties are to blame; where there has been a want of due diligence or of skill on both sides. In such case the rule of law is, that the loss may be apportioned between them, as having been occasioned by the fault of both of them.

Thirdly, it may happen by the misconduct of the suffering party, and then the rule is that the sufferer must bear his own burden.

Lastly, it may have been the fault of the ship which ran the other down; and in that case the injured party would be entitled to an entire compensation from the other.

But although in cases of collision where both parties are to blame, the loss is in the admiralty court apportioned equally between them, such is not the case in the common-law practice of England, where, as a rule, no one can maintain an action for a wrong, if he himself contributed to the act which occasioned the loss, or if he might have avoided it by the use of ordinary care and skill.

If the plaintiff has been guilty of negligence, which was only remotely connected with the accident and not the direct cause of it, the fact will not relieve the defendant from his duty to use ordinary care, the want of which was the direct cause of the accident; and if such want of care was a cause of the accident, the plaintiff will be entitled to damages, although he may have been guilty of negligence in some collateral matter only remotely connected with the accident.

In the case of a collision between two ships, the owners of the ship injured wrongfully or by carelessness of the navigators of the other may either claim their damages in an action against the owners or by an action against the ship in fault. In such cases courts of admiralty issue process, on which the vessel is attached, and then permit her to be returned to the owners upon furnishing security for the decree which may be made.

The British shipping act relieves the ship-owner from damages caused by the fault or incapacity of a licensed pilot in charge of a ship within any district where the employment of such pilot is compulsory, and where the collision is solely occasioned by the said pilot. On the same principle the ship is not liable for damage caused by the fault of harbor-masters when bound to obey their directions, but the burden of the proof in such cases rests with the owner to show that the damage was occasioned by fault of the pilot or harbor-master.

If a collision is entirely accidental and not the fault of either vessel, or if it be caused by the fault of the other ship, the loss is then considered to be a peril of the sea, and underwriters will be held liable to make it good.

The general principles of the French law respecting collisions, which are set forth in the Code de Commerce, are, though somewhat different in their application, nearly the same as the English.

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*See letter of Judge Addison Brown, with reply, in Appendix.

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FRENCH LAW AND CUSTOM.

The law distinguishes three classes of collisions (see Code de Commerce, Article 407):

(1) *Accidental collision.*
(2) *Faulty collision.*
(3) *Doubtful collision.*

All collisions are presumed to be of the first class (accidental) until proved to the contrary. In this class each vessel bears its own loss, and the cargo also bears its loss.

In class 2 (faulty) the faulty vessel has to bear the loss of all parties. These losses include (1) the vessel run down, (2) the vessel's freight, (3) the vessel's expenses and those of her crew, (4) the vessel's cargo, (5) the court expenses; the value of the several losses to be decided by experts.

In class 3 (doubtful) the loss of the vessels is equally divided between them as well as the court expenses, &c. The cargo bears its own loss.

Questions of collisions that occur within the territorial waters of a country generally come under the jurisdiction of the courts where the accident happens; but in cases that take place outside of the 3-mile limit between vessels of different nationalities the authorities differ.

In case of two foreign ships coming in collision in the Channel, and subsequently bearing up for the Downs where they anchored, the wrong-doing ship was stopped by the British authorities until satisfaction was made.

Causes of collision are *communis juris*, and hence a court of admiralty has jurisdiction to entertain a suit between two foreign ships where the collision happened in the territorial waters of the sovereign under whose commission it sits. In these causes of collision, says Flanders's Maritime Law, "between foreign vessels the judgment of the *forum rei sitæ* (the place where the thing is situated), where the proceeding is *in rem* is of universal obligation and absolutely conclusive. The same principle applies to movable property as to immovable. Whatever the court having jurisdiction of the subject-matter determines will be held valid in every other country where the same question comes in judgment before any other foreign tribunal." Where a collision occurs in a foreign harbor and is referred home for decision, the rights and responsibilities of the parties must be determined by the foreign law, and if doubts exist the construction of the foreign courts will be adopted.

A cause of collision and damage is a suit *in rem* in the admiralty, and is commenced in the United States by the filing of a libel and the arrest of the ship to the fault of which the damage is imputed. In the English admiralty the suit is brought by the arrest of the vessel and the filing of a petition. In England the judge is usually assisted at the hearing of the cause by two elder brethren of the Trinity House, or other experienced ship-masters, whose opinions upon all questions of professional skill involved in the issue are generally adopted by the court.

In the American courts the judge usually decides without the advice of experienced seamen, but their evidence as experts is sometimes received in reference to questions of professional skill or nautical usage. Such evidence is not, however, to be admitted to establish a usage in direct violation of those general rules of navigation which have been sanctioned and established by repeated decisions.

The limited liability under the American law in cases of collision is the value of a vessel and amount of freight then pending. In English

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law it has been fixed at £8 sterling per ton, register, and at £15 sterling per ton in case of sacrifice of life as well as of property.

A proposition has been made by Capt. Albert Riondel, a retired officer of the French navy and officer of the Legion of Honor, to adopt an international rule establishing mixed tribunals to take cognizance of cases of collision which occur between vessels of different nationalities on the high seas. His plan, which is set forth and maintained in two pamphlets, entitled "Collision du Saint Germain et du Woodburn—ses conséquences," published by him in 1884, and the "Réforme de la Loi Internationale du 4 Novembre, 1879; sur les collisions en mer et création de tribunaux maritimes internationaux," published during the present year, is embodied in the following article proposed to be incorporated in the Revised International Regulations for preventing collisions at sea:

The competent tribunal for maritime litigation between ships of different nations shall be composed of: (1) One judge belonging to each of the nations concerned; (2) two or three foreign judges (according to whether the number of judges of the nations concerned shall be odd or even) belonging to other nations having adhered to the international law.

The members of this tribunal shall form an odd number.

The nations to whom recourse shall be had for the nomination of foreign judges shall be designated by drawing lots. The drawing shall take place in the presence of the interested parties.

It may be said with regard to the proposition of Captain Riondel, which he is urging with considerable energy before the French and other Governments, that it would have the effect of settling all questions of jurisdiction in causes of collision, and do away with a prevailing fear among shipmasters that injustice might be done in case of putting in to the most convenient port. The establishment of such tribunals would undoubtedly save expense and lead to greater harmony in the interpretation given to the laws on collision by different nations.

The project has been well received by the Chamber of Commerce at Paris and other commercial bodies at the seaports of France, but the Government of that country has not taken the initiative in a movement, the execution of which appears to require the approval and co-operation of so many of the leading maritime States.

Notwithstanding the high reputation for impartiality borne by the courts of France, their rules of procedure are exclusive, and I may state in this connection, for the benefit of parties interested, that the French law in regard to actions brought before French tribunals for the recovery of damages resulting from collisions between foreign and national vessels on the high seas is especially stringent. According to judgments rendered several years ago by the "cour de cassation" on appeal from those given by inferior tribunals, any action for damages in respect of collision brought before a French court against a French ship is null and void unless certain conditions of the French code have been complied with.

(1) The captain of the vessel bringing the action must, within twenty-four hours after arrival at the first port reached after the collision, make his protest and notify either the captain of the French ship or to the acknowledged representative of the owners thereof, and failing there, report his presence to the French consular officer or agent.

(2) Within one month of the date of such notice an action must be brought in a French court. It is useless for the foreign captain to plead that he was misled, either through the formalities of his own law or of those of the nation within whose waters the collision may have oc-

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curred. The moment the case is brought before a French tribunal, it is by French law alone that every point will be governed.

The following case of collision of the steamships Ella Warley and North Star, as reviewed by Justice Bradley, of the Supreme Court, embodies much of the American law on the subject, with frequent reference to decisions in leading foreign cases:

Collision.—Supreme Court of the United States, Nos. 34 and 35, October term, 1882. William H. Reynolds, William N. Taylor and Francis W. Reynolds, composing the firm of Reynolds & Co.; Jabez C. Knight, Cyrus Taft, Edward P. Taft; Benjamin B. Knight and Robert Knight, trading as B. B. and R. Knight; and A. and W. Sprague, appellants, *vs.* William H. Vanderbilt, Cornelius Vanderbilt, William K. Vanderbilt, and Samuel Barton, executors of Cornelius Vanderbilt, deceased, claimants of the steamship North Star, her engine, &c. No. 34.

William H. Vanderbilt, Cornelius Vanderbilt, William K. Vanderbilt, and Samuel Barton, executors of Cornelius Vanderbilt, deceased, claimants of the steamship North Star, her engine, &c., appellants, *vs.* William H. Reynolds, William N. Taylor and Francis W. Reynolds, composing the firm of Reynolds & Co.; Jabez C. Knight, Cyrus Taft, Edward P. Taft; Benjamin B. Knight and Robert Knight, as B. B. & R. Knight; and A. and W. Sprague. No. 35.

Appeals from the circuit court of the United States for the southern district of New York.

(1) In cases of collision of vessels, where both parties are in fault, the maritime rule is to divide the entire damage equally between them, and to make a decree for half the difference between their respective losses in favor of the one that suffered most, so as to equalize the burden.

(2) The obligation to pay the said difference is the legal liability growing out of the transaction.

(3) The practice which obtained in England of decreeing to each party half his damage against the other party, thus necessitating two decrees, is only an indirect way of getting at the true result growing out of the technical formalities of the pleadings and the supposed incongruity of giving affirmative relief to a respondent.

(4) *Semble*, there is no good reason why the respondent in such cases should not have the benefit of a set-off or recoupment of his damage, at least to the extent of the damage done to the libellants, provided that in his answer he pleads such set-off or recoupment.

(5) At all events, if both parties file libels, the courts of the United States have the power to consolidate the actions, and prescribe one proceeding and pronounce one decree, which decree will be for one-half of the difference of damage suffered by the two vessels, as before stated.

(6) The statute of limited liability is not to be applied in such a case until the balance of damage has been struck, and then the party against whom the decree passes may have the benefit of the statute (if he is otherwise entitled to it), in respect of the balance which he is decreed to pay. The decision to the contrary in Chapman *v.* Netherlands Co., L. R. 4 Prob. Div., 157, examined and disapproved.

(7) A collision occurred at sea, in the night, between the steamers W. and N., pursuing nearly opposite courses, and both were held in fault. The W. was sunk and the N. much damaged. Cross-actions were brought and heard together, and one decree was made, being in favor of the owners of the W. for one-half the difference of damage sustained by the two vessels, that of the W. being the greatest. This decree was affirmed.

(8) From the above decree both parties appealed, and now the owners of the W. claimed, under the limited liability act, entire exoneration from liability, and a decree for half of their damage without deducting the damage of the N., which claim was disallowed, because the law of limited liability can only be applied to the balance decreed to be paid, and that was not against the owners of the W., but in their favor.

(9) *Query:* Whether, if there was any ground for such a claim, it could be set up without any allegations or prayer for that purpose in the pleadings?

Mr. Justice BRADLEY delivered the opinion of the court.

This case arose out of a collision off the Jersey shore, south of Sandy Hook, on the evening of the 9th of February, 1883, between two steamships, the Ella Warley, bound from New York to New Orleans, and the North Star, bound from Key West to New York. The former was struck about amidships, and was sunk and lost, and the North Star was considerably damaged. The owners of the Ella Warley libeled the North Star, and the owners of the latter filed a cross-libel in personam against the owners of the Ella Warley. The suits were tried together, and the district court held the Ella Warley alone in fault, and rendered a decree accordingly. The circuit court held both vessels in fault, and rendered a decree in favor of the owners of the North Star for so much of their damage as exceeded one-half of the aggregate damage sustained by both vessels. This was the proper decree to make if the conclusion reached, as to both vessels being in fault, was correct, unless the question arising on the limited liability act hereafter discussed, required a different decree. Each vessel being liable for half the damage done to both, if one suffered more than the other,

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the difference should be equally divided, and the one which suffered least should be decreed to pay one-half of such difference to the one which suffered most, so as to equalize the burden.

Since both of the courts below held the Ella Warley to be in fault, we would not disturb this decision without preponderating evidence to the contrary; and such evidence we do not find. On the contrary, we think that the whole evidence taken together sustains the conclusion reached. The vessels were approaching each other in contrary directions, nearly head on, one going down the coast, the other coming up, and saw each other's masthead lights when 8 or 10 miles apart. The Ella Warley, instead of porting her helm according to the rule, starboarded it in order to pass outside. This was evidently the first cause of the disaster; for as the North Star obeyed the rule, it brought the vessels directly together. It is also obvious that the persons in charge of the Ella Warley did not keep a sufficient lookout; for they allege that they only saw the green light of the North Star until the instant before the collision; whilst it is demonstrable, both from the diagram produced on the part of the Ella Warley, and from the courses which the two vessels must have pursued, that after they were near enough to discern their respective side lights, the red light of the North Star was exposed to the view of the Ella Warley during the entire approach, and must have been seen by her men if they had exercised the least diligence. One of the grounds of complaint against the North Star is, that her lights were not properly screened, and could be seen across her bow. This only makes it the more certain that from the relative position of the vessels, her red light must have been visible. It is impossible that it was hidden from view up to the time immediately preceding the collision.

As to the question whether the North Star was also in fault, we agree with the circuit court that she was. The rules of navigation in force at the time required that the side lights of steamers navigating the sea, bays, &c., should be fitted with inboard screens of at least 6 feet in length (clear of the lantern) to prevent them from being seen across the bow; and to be placed in a fore and aft line with the inner edge of the side lights, and in contact therewith. (1 Parsons' Maritime Law, 679, ed. 1859.) In flat defiance of this rule the screens of the North Star did not project 2 inches forward of the bull's eye of the lights, so that the lights could be seen two or three points across the bow. This was undoubtedly one reason why the green light of the North Star caught the eye of the mate and others on board of the Ella Warley so readily as it did, and, indeed, goes to some extent, to mitigate their negligence in not discerning the red light. This was clearly a fault on the part of the North Star, and one that probably contributed to the accident. We think, therefore, that both parties were in fault.

The counsel for the owners of the Ella Warley now, for the first time, raise a question upon the statute limiting the liability of ship-owners. They contend that as the Ella Warley was a total loss, the owners are not liable to the owners of the North Star at all, not even to have the balance of damage struck between the two vessels; but that the half of their damage must be paid in full, without any deduction for the half of the damage sustained by the North Star. This proposition is so startling that the reasoning employed to support it should be scrutinized with some care before yielding to its force.

The rule of admiralty in collision cases, as we understand it, is that, where both vessels are in fault, they must bear the damage in equal parts, the one suffering least being decreed to pay to the other the amount necessary to make them equal, which amount of course, is one-half of the difference between the respective losses sustained. When this resulting liability of one party to the other has been ascertained, then, and not before, would seem to be the proper time to apply the rule of limited responsibility, if the party decreed to pay is entitled to it. It will enable him to avoid payment *pro tanto* of the balance found against him. In this case the duty of payment fell upon the North Star, the owners of which have not set up any claim to a limit of responsibility. This, as it seems to us, ends the matter. There is no room for the operation of the rule.

The contrary rule is based on the idea that, theoretically (supposing both vessels in fault), the owners of the one are liable to the owners of the other for one-half of the damage sustained by the latter, and *vice versa*, that the owners of the latter are liable to those of the former for one-half of the damage sustained by her. This, it seems to us, is not a true account of the legal relations of the parties. It is never so expressed in the books on maritime law. On the contrary, the almost invariable mode of statement is, that the joint damage is equally divided between the parties; or (as in some authorities) it is spoken of as a case of average. Thus, Lord Stowell says, "A misfortune of this kind may arise where both parties are to blame, where there has been want of due diligence or of skill on both sides; in such a case the rule of law is, that the loss must be apportioned between them, as having been occasioned by the fault of both of them." (The Woodrop Sims, 2 Dods., 83.)

This statement of the law was adopted in the text of Abbott on Shipping (P. III,

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c. 1, sec. 2). It is also adopted by Mr. Bell in his Commentaries on the Laws of Scotland (vol. 1, 580, 581), who remarks: "By the maritime law this is a case of average loss or contribution, in which both ships are to be taken into the reckoning so as to divide the loss." It is also adopted in the later text-writers. (See MacLachlan on Merchant Shipping, 274.)

In Hopkins on Average, page 189, it is stated thus:

"If, as the result of the cross-actions in admiralty, both vessels be found in fault, the rule of the court is to add the damages, losses, and costs of the two ships together and to divide the joint sum in moieties and decree each vessel to bear an equal portion."

If we go back to the text of the law in the Rules of Oleron, followed in the laws of Wisbury and other laws, we find it expressed in substantially the same manner. The case is supposed of a ship coming into port negligently managed and striking a vessel at anchor in an improper position, so that both are in fault and both are damaged. The rule says: "The damage ought to be appraised and divided half and half between the two ships, and the wines that are in the two ships ought to divide the damage between the merchants." (1 Pardessus, Collection de Lois Maritime, 334; Cleirac, Us et Coutume de la Mer, 50; Sea Laws, 141; 1 Peter's Admiralty Decisions, App. XXIII.)

In Jacobsen's Law of the Sea it is said:

"If the damage is done reciprocally, such damage is apportioned in common between the parties."

The French ordinance of 1681 expresses the rule in exactly the same way: "The damage shall be paid equally by the ships which have caused it and suffered it." (*Valin*, 1, *III.*, *tit. vii*, *art.* 10.)

On this Valin remarks:

"Whenever damage by collision is adjudged common average between the two ships, the decree is that the costs of suit and the appraisement of the damage shall be equally borne in common, to effect which they are made into one mass, with a calculation of the average.

Emerigon, who had great experience as an admiralty lawyer and judge, says upon the same article:

"The damages sustained by both ships are appraised and made into one mass, which is equally divided. (*Assurances*, *c.* 12, *sec.* 14, ¶ 3.)

Boulay Paty, commenting on the Code de Commerce, art. 407, which relates to the same subject, says:

"We conclude, then, that, after due regard is had to the character of the damaged parts of each ship, the injury and damage which they have sustained, and the appraisal thereof, being added together in a single mass, must be divided so as to be equally borne by each of the ships which have been struck." (*Droit Commercial*, *Vol. IV*, 497.)

In this country the same mode of expressing the law has always prevailed. The first case in which the question came before the court was that of *The Catherine vs. Dickinson and als.*, 17 *How.*, 170, in which both vessels were adjudged to have been in fault, and the court, by Justice Nelson, adopted the admiralty rule as it had been administered in the district and circuit courts. Justice Nelson said:

"The question, we believe, has never until now come distinctly before this court for decision. The rule that prevails in the district and circuit courts, we understand, has been to divide the loss"; and he cites the case of the Rival, decided by Judge Sprague (*Sprague's Decisions*, 160), and the leading English decisions on the subject. Subsequent decisions have invariably used the same language. (21 *How.*, 184; 9 *Wall.*, 513; 11 *Wall.*, 164; *S. C.*, 18 *Wall.*, 51, 56; 92 *U. S.*, 695; 93 *U. S.*, 313; 3 *Kent*, 231.)

These authorities conclusively show that, according to the general maritime law, in cases of collision occurring by the fault of both parties, the entire damage to both ships is added together in one common mass and equally divided between them, and thereupon arises a liability of one party to pay to the other such sum as is necessary to equalize the burden. This is the rule of mutual liability between the parties.

But when claims are prosecuted judicially, the courts regard the pleadings, and the English courts are very strict in holding the parties to their allegations, and in refusing relief unless it is sought in a direct mode. If only one party sues, and the other merely defends the suit, and upon the proof it appears that both parties are in fault, the court declares this fact in the decree, and decrees to the libellant one-half of the damage sustained by him; the damage sustained by the respondent not being regarded as the subject of investigation determinable in that suit. This technical result of the form of proceeding and pleadings, in which the respondent suffers himself to be placed in a position of disadvantage, has led to the erroneous notion that each party is entitled by the law to be paid one-half of his damage by the other party, and that each claim is independent of the other. But where both parties file libels, as they are entitled to do, although to conform to the pleadings a decree may be rendered in each suit in favor of the libellant for one-half of his damage, even the English courts will

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not allow two executions, but will grant a monition in favor of that party who has sustained most damage for the balance necessary to make the division of damages equal. This is an awkward way of arriving at the result contemplated by the law. It may have its conveniences in some cases, as where the innocent owners of cargo are the libellants, for they are not responsible for any part of the loss. But as between the ship-owners themselves, it involves an apparatus of two distinct suits to get at one result, when one suit or two suits consolidated together would be in every respect more convenient. The difficulty is obviated in England to a certain extent, where each party has brought suit by directing, with the assent of the parties, that the proceedings shall be conducted together so as to save the expense of a double investigation.

To show the difficulties under which the English admiralty courts have labored in seeking to do complete justice, one or two cases may be referred to. In the case of the Seringapatam, reported in 2 W. Robinson, 506, and 3 W. Robinson, 38, a collision had occurred between that ship and the Danish ship Harriet, by which the latter was sunk with a loss of ship and cargo. A libel was filed by the owners of the Harriet and cargo against the Seringapatam, and an appearance was entered. A cross-libel was also filed, but as the owners of the Harriet resided abroad no process could be served, and no appearance was entered, and the suit was discontinued. A decree was made in the original suit declaring that both parties were in fault, and that the damage should be equally borne by them, and condemning the respondents to pay a moiety of the damages suffered by the Harriet and her cargo. After an appeal and affirmance of the decree, motion was made in behalf of the owners of the Seringapatam, praying that the court in estimating the compensation due to the owners of the Harriet, would direct the registrar to ascertain and deduct therefrom a moiety of the damages sustained by the Seringapatam. But it was objected that the owners of the latter were only defendants and no prayer for compensation was made in their behalf and none could be allowed.

Dr. Lushington says:

"If the two actions had been going on according to the ordinary usage and practice in these cases, the sentence of the court would have attached to both vessels, and the court would have decreed a joint reference to ascertain the amount of the total damage, and would have directed the said damage, with the costs, to be equally divided between the respective owners. The cross-action, however, having been abandoned, the court made its decree for a moiety of the damage done to the Harriet, and this decree has been affirmed by the privy council." Then, after showing that the appeal and affirmance would not stand in the way of doing justice, he adds: "I do not exactly see how I can deal with the second suit which has been abandoned, as an existing suit, and say to the owners of the Seringapatam, you shall have the benefit of a decree, which, in point of fact, has never been pronounced in their favor. The difficulty, it is true, is created by the peculiar circumstances of the case itself, and if I could have foreseen the result of the proceedings before the Trinity masters, I would certainly have made some arrangements at the time to meet the circumstances of the case; for I never will be induced, unless compelled by law, to further the commission of an injustice toward either party upon a mere matter of form. Taking all the circumstances of the case into my consideration, the course I shall adopt is this: I shall not depart from my original decree, but shall confine the reference to the amount of the compensation to which the owners of the Harriet are entitled. At the same time I shall not permit the full amount of that compensation to be paid to them unless they submit to the deduction of a moiety of the damages sustained by the owners of the Seringapatam."

In the case of the Calypso (*Swabey*, 25) a collision had occurred with the Equivalent. The owners of the Calypso brought suit, and the decree was that both parties were in fault, and pronounced for half the Calypso's damage. Then the owners of the Equivalent sued, and the owners of the Calypso presented a petition that the suit should be dismissed, because of the former adjudication. Dr. Lushington declined to dismiss, but without deciding whether the matter might not be set up as a defense, and intimated that it was not commendable to wait the result of one action before bringing a cross-action, and he refused costs. He said:

"The usual practice is that when one vessel has been proceeded against in a cause of collision, and the owners of the other think they have any chance of obtaining a decree in their favor to enter a cross-action, and it is generally agreed between the practitioners that the decision in the one case shall govern the decision in the other, I am not aware that it is in the power of the court, if the proctors were not consenting to such an agreement, to say that both actions should be governed by one as a matter of right."

These cases serve to show how, by reason of the technicalities of procedure and the clumsiness of the process used for attaining the correct result, the original maritime rule, though in itself simple and easy of application, became involved and obscured.

Thus, where the merchant shipping act declared that if certain rules of navigation were infringed, the owner should not recover for any damage sustained in a collision,

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it was held that he should not have the benefit of average (*The Aurora, Lush., Adm.*, 327); and where the same act exempted the owner from responsibility for the acts of a compulsory pilot, it was held that he should not be subject to average, though entitled to recover half of his own loss from the other vessel in fault (*The Montreal*, 17 *Jurist*, 538; *S. C.*, 24; *Eng. L. and E. Rep.*, 580). These decisions were contrary to the maritime rule, though perhaps in the former case, the words of the statute required the construction given to it. (*See Parsons, Shipping and Adm.*, 596; 2 *do.*, 115–117.)

A like departure from the maritime rule, we think, was made in the late case of Chapman and *als. vs.* The Netherlands Steam Navigation Company (L. R. 4 Prob. Div., 157), which is much relied on by the counsel of the Ella Warley. In that case a collision occurred between the Savernake, owned by Chapman & Co., and the Vesuvius, owned by the Netherlands Company, by which the Vesuvius was sunk with a total loss of ship and cargo, valued at £28,000, and the Savernake was damaged £4,000. The owners of the Vesuvius brought suit, and the owners of the Savernake put in a counter claim, the substitute created by the judicature act for the old cross-action.

Both parties being declared in fault, a reference was made to the registrar to ascertain the damages of the various parties. At this point the owners of the Savernake filed a bill in equity to obtain the benefit of limited liability, proffering £5,064 as the value of their ship, at £8 per ton, and obtained a decree for paying into court that fund, with interest. The question then arose as to the disposition of this fund, and for what amount each party in interest should be permitted to prove for dividend. Sir George Jessel, master of the rolls, decided that the owners of the cargo of the Vesuvius, and her master and crew, were entitled to prove for half of their loss. As to the owners of the ship, his decision was that the proper amount to be proved was the half of her value less the half of the loss sustained by the Savernake, according to the maritime rule as before explained. The owners of the Savernake appealed, and contended that their claim for a moiety of damage sustained by them (which was £2,000) should stand good against the owners of the Vesuvius absolutely, and should not be deducted from the moiety of loss sustained by the Vesuvius, but that the owners of the latter should prove against the fund for their entire moiety of loss without deduction. This would have the effect of enabling them to set off the £2,000 against any dividend which might be awarded to the owners of the Vesuvius, and would enable them to get back so much of the amount paid into court. The master of the rolls had considered this a preposterous claim and contrary to the meaning of the maritime rule. But the majority of the lord justices, Bagallay and Cotton, against the opinion of the Lord Justice Brett reversed the decision, and decreed in the manner contended for by the appellants. We have carefully considered the reasons given by the various judges and are unable to avoid the conclusion that the master of the rolls and Lord Justice Brett took the proper view of the subject.

In this country the courts of the United States are not subject to the same disabilities which embarrass the proceedings of the English courts. By the act of Congress of July 22, 1813 (*Rev. Stat.*, § 921), it is enacted that "where causes of a like nature, or relative to the same question, are pending before a court of the United States, the court may make such orders and rules concerning proceedings therein as may be conformable to the usages of courts for avoiding unnecessary costs or delay in the administration of justice, and may consolidate said causes when it appears reasonable to do so." The power of consolidation here given enables the district courts sitting in admiralty to provide for cases of the kind under consideration in a manner adapted to the ends of justice, and the exact rights of the parties. We understand that it is freely exercised by them. At all events it clothes them with the necessary authority in cases of collision, to combine the suits arising thereon into a single proceeding, and where both parties are found to be in fault, to make a single decree (as was done in this case) in accordance with their rights and obligations as resulting from the law, and even where no cross-libel is filed, if the respondents in their answer allege damage sustained by them in collision, and charge fault against the vessel of libelants, and pray a set-off or recoupment in case they should themselves be held to be in fault, we see no good reason why they should not have the benefit of average afforded by the law, at least to the extent of the claim of the libelants. This would be more in accord with the liberal spirit in which the rules of pleading are administered in this country than a rigid adherence to the English practice would admit of. In the case of the Sapphire (18 *Wall.*, 56) Mr. Justice Strong, delivering the opinion of this court, observed: "We do not say that a cross-libel is always necessary in a case of collision, in order to enable claimants of an offending vessel to set off or recoup the damages sustained by such vessels, if both be found in fault. It may however, well be questioned whether it ought not to appear in the answer that there were such damages." As it nowhere appeared by the pleadings in that case that the respondents had sustained any damage, it was held that they had waived any claim for such damage. The sug-

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gestion of Justice Strong, however, as to the non-necessity of a cross-libel is a very frequent one.

But waiving further discussion as to the proper or admissible mode of pleading—for the respondents in this case did file a cross-libel—it is sufficient to say that the forms and modes of proceeding in the courts of the United States are not such as to interpose any serious difficulties in the way of carrying out the simple rule of the maritime law with regard to averaging the damages occasioned by the collision where both vessels are in fault; and if they were it would not alter the relative rights of the parties as settled by that law. We have referred to the embarrassments caused by technical rules of procedure in the English courts for the purpose of accounting for their apparent departure from the maritime rule of liability in some cases.

In conclusion, it is proper to remark that the British statutes on the subject of limited responsibility of ship-owners, as well as those which regulate the forms of proceeding, are different from ours. The rule of limitation as administered by us is much more liberal to the ship-owners than the English rule We only make them liable, when free from personal fault, for the value of their ship after the collision, so that if the ship is lost their further liability is extinguished, whilst in England it is maintained to the extent of £8 per ton, and in some cases £15 per ton of their ship's measurement. To apply to our law the rule of construction which was given by the lords justices in the case of Chapman *vs.* The Netherlands Company, would often result, and would in this case result, in positive injustice. It would enable the owners of the Ella Warley to obtain full compensation for a moiety of their loss, whilst the owners of the North Star would have to sustain both their own entire loss and half of that of the owners of the Ella Warley, whilst both vessels were alike to blame for the collision. A rule which leads to such results cannot be a sound one.

Applying to the present case the maritime rule, as we understand it, it being ascertained that both parties were in fault, the damage done to both vessels should have been added together in one mass or sum and equally divided, and a decree should have been pronounced in favor of the owners of the Ella Warley (which suffered most) against those of the North Star (which suffered least) for half the difference between the amounts of their respective losses, for the Ella Warley by her loss discharged her portion of the common burden, and so much more as the amount that would thus be decreed in her favor. Her delivery to the waves was tantamount to her surrender into court in case she had survived. It extinguished the personal liability of her owners by the mere operation of the maritime rule itself. As there was no decree against her owners for the payment of money, there was no room for the application in their favor of the statute of limited liability. The owners of the North Star do not claim the benefit of the law, and probably could not, because the fault of that ship lay in her original construction, and was attributable to the owners themselves. So that, in fact, the question of limited liability had no application to the case. At the same time it is proper to say that it is at least questionable whether the benefit of the statute can be accorded to any ship-owner, or owners, in the absence of any claim therefor in the pleadings. Such claim must always be based on the collateral fact that the loss or damage was "occasioned or incurred without the privity or knowledge of such owner or owners" (Rev. Stat., sec. 4283), and it would seem that an allegation of that fact should somewhere appear in the pleadings. As no such allegation is made, and no claim of the kind is set up by the owners of the Ella Warley, it would be exercising a greater latitude of indulgence to allow it to be set up now than has ever been asked of this court before. Nevertheless, as the time within which a party may be allowed to institute supplemental proceedings for obtaining the benefit of the law, has never been precisely defined, we have deemed it best to decide the case upon the rights of the parties on the merits, in order to save further litigation and expense. Since, therefore, the decree of the circuit court was made in precise conformity with the views which we have expressed, it must be affirmed with interest from its date; and inasmuch as both parties have appealed from said decree upon grounds which have not been sustained, each party should pay their own costs on this appeal; and the cause must be remitted to the circuit court for such further proceedings as may be in accordance with law.

In former times, when only sailing ships navigated the ocean, notwithstanding the difficulties attending their evolutions, collisions on the high seas were comparatively rare, and when they did occur the consequences were mostly limited to damages more or less serious to one or both vessels. It was extremely rare that a vessel was sunk or any lives lost. But since the advent of steam as a propelling force a change has gradually been going on. Now, hardly a night passes without the occurrence of one or more of these accidents, which frequently entail the most serious consequences, often one, and sometimes both, of the collid-

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ing ships going to the bottom with more or less of the passengers or crew. The cause of the gradual increase in the list of losses by collisions is not thought to be due to increasing inefficiency or carelessness of the navigators, but is generally attributed to the gradual increase of vessels propelled by steam, which, running at full speed in thick and foggy weather, greatly multiply the chances of contact. The usual speed of an ordinary steamer is ten to twelve knots, while the speed of the fast mail steamers is fifteen to eighteen and even twenty knots. It has been remarked that this is the velocity of a railway train in motion, and we all know that the funnel of an advancing locomotive is scarcely in sight before the train rushes past.

It has been suggested, as a wise precaution in narrow waters, where practicable, as in the Channel, Mediterranean, &c., to adopt, as far as possible, laws, by following which, steamers going up would avoid the track of those going in the opposite direction, and so lessen the chances of accident.

Moreover, the revolution that has been going on from wood to iron vessels has operated against the chances of saving life and property after a collision. The comparatively thin sides of an iron vessel are broken with the smallest shock; the water rushes freely into the aperture, and even when fitted with collision bulkheads, or partitions, it is frequently with the utmost difficulty that, under the most favorable conditions, the vessel can be kept afloat long enough for the people on board to escape by means of the boats. Again the proportion of increase in steamers is much greater in narrow waters than upon the open ocean, in the straits and channels which ships have to pass through in going out of port, or where they come together at the end of the voyage. In these confined passages, where fishermen and coasters congregate and steamers are running in every direction, the danger of collision has proportionately doubled.

But notwithstanding the increase of the danger there has been scarcely any increase of precautions against it.

The alarming frequency of disasters from accidents of this kind have, however, been the occasion of many suggestions for their prevention. Nearly all cases of collisions take place in the night time, and it is thought that inefficient lights, on account of bad oil in many cases, lead to the accident without any fault of the captain, for it is one of the pernicious customs of dishonest traders to mix poor, cheap oil with the better quality, the compound being wholly unfit for use in ships' lamps.

The poor or faulty colored glass used for ships' lanterns doubtless also causes mistakes which often lead to collision.

Defective vision in the observer is also found to be quite common, and doubtless leads to errors in distinguishing the color of lights. The green lights used are said in many instances to be so indistinct as not to be seen before the vessel's sails are observed.

Sailing vessels are exempt from any rules of inspection in this respect, and, although it would be considered a duty that owners and captains would attend to in self-defense, or as a matter demanded in protection of lives and property, it is one that is said to be often carelessly performed and sometimes entirely disregarded. The lack of proper screens to the side lights, so that they cannot be seen on the opposite side or beyond the proper angle, is a matter also requiring attention, and it is recommended that sailing vessels be placed under the same rules of inspection as steamers, and that these rules be more strictly enforced in both.

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Accidents from collision between sailing vessels and steamers are sometimes said to be brought about by a sudden change of course on the part of the former. It should be borne in mind that according to the rule of the road, under all circumstances, vessels under canvas have the right of way, and vessels under steam must keep out of their course. Therefore it is the duty of the sailing vessel not to change her course on account of an approaching steamer. Captain Kelly, of the steamer City of Macon, speaking of the danger of collisions between sailing ships and steamers, says a sailing vessel should be kept steadily on her course when meeting a steamer that is under headway, and pay no attention to her whatever, and should be free of responsibility for damage if she does so.

"I believe that ninety-nine out of a hundred collisions between sailing vessels and steamers in clear weather are caused by the sailing vessel varying her course to avoid the steamer, whereas, if she had kept steadily on her course there would have been no collision. I have had many narrow escapes from this cause.

"In confined waters like the Vineyard Sound, a steamer may meet a hundred sailing vessels in going a short distance, and it may be necessary for the steamer to go very close to one to clear another. Now, if sailing vessels go to varying their courses to avoid a steamer, the chances are a hundred to one for a collision.

"Sailing vessels, when meeting steamers in such a direction that their side lights ought to be seen, should not show a flash or torch light, as it entirely eclipses their side lights and sails, but they should see that *their side lights* are burning brightly."

A careful observance of these precautions, with a good lookout kept at all times (for it cannot be denied that in many cases a lookout at his post to give prompt notice of the position, &c., of the approaching vessel would have caused different action and avoided the collision), and it is thought that these serious accidents will at least be diminished.

But there are times when even a good lookout may be unavailing, in those dense fogs which occasionally prevail on our coasts, and at times in all parts of the world. These fogs are usually accompanied by calms, when the sailing vessel is motionless, or is fanning with a light breeze through the water at a slow rate. But not so with the steamer. She is often propelled with undiminished speed, in defiance of the thirteenth article of the Revised International Regulations, which says that "every vessel, whether a sailing ship or a steamship, shall in a fog, mist, or falling snow go at a moderate speed."

Too much care cannot be had by officers of steamers to slow down or stop during dense fogs, when the lookout is rendered powerless in consequence of the impenetrable darkness that surrounds all.

The terrible consequences of a collision at sea have been recently exemplified on our coast in the case of the British steamer Oregon and an unknown vessel supposed to be the American schooner Charles H. Morse, both of which vessels sunk, the latter so suddenly as to carry all hands to the bottom with her, leaving no one to tell the tale of the cause of the accident from her own standpoint. However, as a sailing vessel has under all circumstances the right of way, it is to be presumed that no blame can be attached to the schooner, more especially since her lights were seen by persons on board the steamer.

The facts in the case as brought out in the examination of the British Board of Trade do not seem to clear up all the doubts attending the

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affair, and it might still be reasonably inferred that a proper and vigilant lookout was not kept on board the Oregon.

The circumstances under which the collision took place seem to prove this. The night was reasonably clear, and the weather fine, with a light breeze from the westward. The Oregon was proceeding on her course at a rate of 18 knots towards Sandy Hook, then about 50 miles distant, Fire Island light-house, on Long Island, being about half that distance to the northward.

The schooner (assuming it to have been the Charles H. Morse) would be steering with the wind aft in an east-northeast direction to carry her clear of Montauk Point on her course towards Boston, and was probably going through the water at a comparatively slow speed, not over four or five knots. To have endangered collision between the two vessels approaching each other under such conditions, the green light of the schooner would have been observed by the steamer, and the red light of the steamer would have been visible on board the schooner; but it is quite possible that the people on board the Charles H. Morse would, upon the near approach of a large steamer coming for them at such a prodigious rate, change the course in order to escape the threatening destruction, and thus screened her side lights to those on board the steamer shortly before the moment of contact. In this case the steamer would have struck the schooner aft, or on her quarter, and being loaded with a full cargo of coal, the shock must have been heavy, sufficient, indeed, to render both vessels helpless. But the evidence, which was quite contradictory, appears to indicate that the schooner's bowsprit first struck the steamer's side. This is hardly probable, as the force of the blow under such circumstances would be greatly diminished. In fact a schooner coming up from abeam at so moderate a rate of speed, and striking the side of a steamer moving at right angle would ordinarily cause a shock scarcely more than sufficient to carry away her jib-boom and bowsprit, while the steamer's side must be very weakly constructed to be disabled by a comparatively small concussion of that kind. At the official inquiry into the cause of the wreck Mr. Matthews, the chief mate, testified that about fifty seconds before the collision he saw a white light and he saw no other; he took it to be the light of a pilot-boat. It is said in this connection that the sight of every officer selected for lookout duty was thoroughly tested by the surgeon. Matthews said that had any green light been burning he must have seen it.

The man on the lookout forward says that just before the collision he saw a green light close to, and the schooner before described as a three-master, disappeared; the lookout on the other bow also saw this green light, and the chief officer saw it. One of the men who was getting up the mails preparatory to delivering them, said he saw a red light, and a quartermaster on going forward saw a flare-up light close to on the port bow. The same officer afterward saw a white light which he thought was half way up the mizzen peak.

The boatswain, William H. Whittle, who was superintending getting up mails, deposed that he saw a red light.

The fourth officer, McMinnies, testified that the first light he saw was a white light, about a point on the port bow, and he saw no other lights. He also says he would have seen any side light had there been any.

Julius Bartlet, seaman, who was on the port side looking out, said he first saw a flash-light; after that he saw no light, until a second or two

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before the collision, when he saw a green light near by, abreast of them; he only had a glimpse of it, and he saw no red light.

William Howgate, seaman, lookout on the turtle-back forward on the starboard side, testified that he saw the white light, and also a green light.

John Rogers, seaman, on the front of the promenade deck, testified that he saw the white light. He saw the jib-boom strike the steamer, and as the schooner surged past he saw a red light and said it appeared weak, like a light shining through a curtain.

John Cunningham, quartermaster, who was stationed in the after wheel-house, testified that he distinctly saw a three-masted schooner under all sail except the head-sail (which had been carried away); that he saw a white light which he thought was in the mizzen rigging, but no colored lights.

A seaman named Linsey, who was engaged getting up the mails, said that he saw a "flare-up light," and later a white light, and he saw plainly a three-masted schooner, and after the collision he saw "a red light like an ordinary side light."

The Oregon was built with water-tight bulkheads, and considerable surprise has been expressed that with smoooth water she should go down in a few hours, notwithstanding these safeguards. From testimony given at the court of inquiry, it appears that the doors in the bulkheads were open, and the horizontal grooves being choked up with coal, it was found impossible to close them.

The unexpected sinking of one of the alleged finest specimens of modern iron steamships constructed to satisfy the requirements of the British admiralty, so shortly after the collision, has called forth considerable discussion as to the construction of collision bulkheads and reliability of separate water-tight compartments.

The London Engineer says upon this subject:

There is still much room for ingenious improvement in the construction of iron steamers or vessels, so as to render them practically unsinkable even after collision or partial injury to their hulls by striking upon banks or rocks, without thereby rendering the vessel commercially unfit for its purpose, by excessive subdivision or expensive construction. As matters now stand, this may appear to be an impossibility, but the history of invention has always been that it is the scope of ingenious inventors to surmount that which appears at first sight to be an impossibility. There is much humbug extant in the commercial marine generally as to the protection afforded by the only attempt hitherto made in this way, by the use of transverse bulkheads. Practically there are very few, if any, commercial steamers or vessels divided into anything like a sufficient number of water-tight compartments, so as to insure buoyancy after collision or partial damage to the hull. The chief exception that can be made to these criticisms is with regard to the present generally adopted construction of fore-peak, which is now invariably parted off from the hull of the vessel by a bulkhead sufficiently near to the stem of the vessel to prevent foundering from an accident to the bow of the vessel. It must be remembered, however, that it is very seldom, if ever, that two vessels collide both stem on. One or other of the vessels usually receives the damage somewhere in its quarters or sides, resulting in almost certain destruction to the vessel. There can be little doubt that a large percentage of the unexplained losses of merchant steamers may be put down to collisions in which both vessels founder, and of which, therefore, no account ever reaches us.

It would be a great gain to the safety of our commercial marine generally and to the nation at large by the additional security from total loss that would be conferred if something like a reasonable method of construction could be adopted, by which damage to any part of the hull could be localized to such an area or volume as would not dangerously affect the buoyancy of the whole vessel. Of course the commercial objections to any such system as would first present themselves to the constructor, are most serious and obvious. The cargo accommodation of a steamer so provided would, at first sight, be thereby hopelessly impaired. It must be remembered, however, that the ideas hitherto developed in this direction are very limited in their nature, and seem to be almost entirely confined to the subdivision of the hull by transverse bulkheads. Is it not possible that more attention to the possibility of longi-

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tudinal, horizontal, or diagonal subdivision might materially reduce the disadvantages of such a system? Again, might it not be possible for such subdivisions to be effected to such a degree after the cargo has been stowed as to leave the largest space available for stowage and removal of cargo whilst subdivision might be effected when in transit? As the construction of bulkheads is at present carried out, much criticism also may be fairly given upon the absurdity of such bulkheads being insufficiently strong to carry the water pressure for which they are designed in case of accident. It must be remembered that when called upon to fulfill their purpose of giving buoyancy to a vessel, they are to all intents and purposes fulfilling the same function as the hull, and must, therefore, represent considerable resisting power. Frequent reports as to the action of collision bulkheads after damage to the stem of the vessel have shown that it is usually only with the greatest difficulty and with considerable shoring that the collision bulkheads can be made to carry the necessary water pressure. Their flat form renders them exceptionally weak in their capabilities of resistance, but we do not know why flat bulkheads should be so universally adopted, as we see no serious objection to make them curve convexly to the axis of the vessel. This would render them much stronger than could ever be the case with flat bulkheads for carrying pressure on the concave or convex surface.

The water continued smooth after the accident, and as several vessels happened near the scene, there was no trouble in transshipping the crew and passengers of the Oregon, who were by a fortunate combination of circumstances all saved. But there seems to have been no effort to save the crew of the sunken vessel. Probably, in the confusion of the moment and apparent danger of those on board the steamer, there may have been some excuse for this seeming neglect. But the unfortunate crew of the schooner, nine persons in all, were the only victims of the casualty.

The courage of the sailor is universally recognized to be of that generous nature that impels him to risk his own life to rescue that of a fellow-being.

So numerous are the instances where seamen have cheerfully rendered generous assistance in times of shipwreck and distress, that the bravery of sailors has become proverbial. They have been the first to man the boats to go through the breakers to the relief of the stranded vessel and the last to leave the wreck when there is no longer any service to be performed. This is true of all sailors, whether British, French, German, Spanish, Italian, or Scandinavian, as well as American, and when we hear sometimes of men in command of ships or steamers leaving the foundering vessel which they have disabled (too often by their own negligence) and her crew to drown, it leads one to doubt whether such persons deserve to be classed as sailors. How is it that in many such cases assistance is not proffered, and the wrong-doing ship sails away leaving the victims to struggle in the water and perish unaided?

In answering such questions the circumstances of each particular case should be considered; but to the credit of the sailors themselves (meaning the foremast hands) it may be said that they are not in fault. The blame in such instances must be with the officers, who, having command of the vessel, have authority to give orders. It is true that the man on the lookout, or the man at the wheel, may have by neglect of duty or carelessness contributed to the disaster, but being without authority to order the vessel stopped and to stand by the wreck, they would certainly be free from any charge of inhumanity after the accident occurred.

That charge could only rest on the master and officers, though in some cases it has been said that it should be shared by the owner, who, it has been suggested, engages a master to make a short voyage and gives him to understand that he must under no circumstances heave to.

It has also been suggested that some captains are prompted to make

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off under such circumstances in order to avoid being recognised, and so escape a lawsuit for damages.

The English law is sufficiently distinct on this subject. The merchant shipping act of 1862 requires that in cases of collision the officer in charge of the deck of each vessel shall give to the other vessel the name of his own ship, with certain other particulars, and that they assist each other in case of need.

The following are the sections relating to these matters:

SEC. 9. In every case of collision between two vessels it shall be the duty of the master of each vessel to give to the master of the other vessel the name of his own vessel and of her port of registry, or of the port or place to which she belongs, and also the names of the ports or places from which and to which she is bound. Any failure to give such information, except under circumstances which render it impossible or unnecessary to do so (proof of which shall lie on the master failing to give it), shall involve the same consequences as failure to render assistance to the other vessel, or to the master, crew, or passengers thereof.

In this section the term "vessel" includes any vessel used in navigation, however propelled.

The consequences of not standing by in cases of collision are as follows:

SEC. 27. All owners and masters of ships shall be bound to take notice of all such regulations as aforesaid, and shall, so long as the same continue in force, be bound to obey them, and to carry and exhibit no other lights and to use no other fog-signals, than such as are required by the said regulations; and in case of willful default, the master, or the owner of the ship, if it appear that he was in such fault, shall, for each occasion upon which such regulations are infringed, be deemed to be guilty of a misdemeanor.

SEC. 28. In case any damage to person or property arises from the non-observance by any ship of any regulation made by or in pursuance of this act, such damage shall be deemed to have been occasioned by the willful default of the person in charge of the deck of such ship at the time, unless it is shown to the satisfaction of the court that the circumstances of the case made a departure from the regulation necessary.

SEC. 29. If in any case of collision it appears to the court before which the case is tried, that such collision was occasioned by the non-observance of any regulation made by, or in pursuance of, this act, the ship by which such regulation has been infringed shall be deemed to be in fault, unless it is shown to the satisfaction of the court that the circumstances of the case made a departure from the regulation necessary.

STEERING OF STEAMERS IN DANGER OF COLLIDING.

The "Dangers of the Modern Rule of the Road" is the title of a late work by Captain Colomb of the British navy, in which he shows by various diagrams the maneuvering power of steam vessels as affecting collisions. This work treats of the performances of steamers as representing various types drawn from over three thousand curves, from which may be deduced certain conclusions regarding collisions between steamships.

Among the conclusions reached as abbreviated and set forth in an interesting tract by Commander W. Bainbridge Hoff, U. S. N., lately published by D. Van Nostrand of New York, are the following:

(1) Altering course is not the same as altering the ship's head. If a vessel was steering north, and her helm was put hard over until she headed NE. by E. ½ E., she will really have steered somewhere about N. by E., and it will have taken her something like four times its length to do this in.

(2) If the speed is changed and the helm is put over at the same instant, the vessel will turn through the first octant (that is, the first four points) on nearly the same curve that it would if no change had been made in the speed. For instance, if a vessel at full speed was to back suddenly and put its helm over at the same time, the vessel would turn

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on nearly its full-speed curve in nearly the same time. However, if the engines were reversed, the speed of the ship (if a single screw), after she had changed the direction of her head four points, would be *nil*, and the greatest effect would be exercised on checking her advance.

(3) To avoid collision when the separating distance is very small, each vessel must maneuver to avoid collision.

(4) Ships in turning, when the helm is put over, instead of starting out immediately to pass to the right or left of the course in obedience thereto, move first bodily to that side towards which the helm is first put, and then turn in the proper direction, but are not clear of their former courses until their heads have changed direction fully three points, two or more ship's lengths ahead of the point at which their helms were put over.

(5) After a ship's head has turned through five or six points, the chances of collision are not increased or lessened by the rest of the turn. The time required to do this with a vessel moving at the rate of twelve knots is about eighty-five seconds. The vessel's advance in this case would be about six times her length, and her transfer would be about twice her length.

The subject may be considered in five categories:

(1) Where the maneuvering vessel has much greater speed.

(2) Where the maneuvering vessel has an excess of speed.

(3) Where the speeds of the two vessels are alike.

(4) Where the maneuvering vessel has inferior speed.

(5) Where the maneuvering vessel has much less speed than the other vessel.

The consideration of these categories (which are explained and illustrated by diagrams at the end of this report) offer certain conclusions from which the following collision table is constructed:

Table showing what A must do with its helm to avoid B.

B bears from A—	If A has in regard to B—				
	Much greater speed (A. 12 knots and B. 6 knots).	An excess of speed (A. 12 knots and B. 9 knots).	Equal speed (A. 12 knots and B. 12 knots).	Inferior speed (A. 9 knots and B. 12 knots).	Much less speed (A. 6 knots and B. 12 knots).
Ahead	Both port	Both port	Both port	Both port	Both port
Two points on the bow.	Port	Port	Port	Port	Port
Four points on the bow.	Danger ceases.	Either helm (Best slow and port.)	Either helm (Best slow and port.)	do do	do do
Two points forward beam.		Danger ceases.	Starboard	Starboard	Starboard
Abeam			Danger ceases.	do	do

It is conceded that the directions given in the above table may not apply under all circumstances, but it is claimed that the danger of collision will be very much lessened by their observance when practicable. In cases when only one vessel is called upon to maneuver, the following conclusions are arrived at by Commander Hoff:

Under the Rule of the Road the vessel having the other on its starboard side is to maneuver, and the other to keep its course.

The area from ahead of the maneuvering vessel to four points on its starboard bow can be called the *port helm octant*, in which port helm will be used, and the area from four points on a vessel's starboard bow to a bearing on its starboard beam, can be called the *starboard helm octant*, in which starboard helm will be used,

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Whenever, to avoid collision, starboard helm is used, the maneuvering vessel can, by backing, stopping, or reducing speed, according to the proximity of the ships, put the vessel to be avoided in the port helm octant.

The greater the difference of speed between the vessels, provided the faster vessel is the maneuverer, the smaller the sector of danger as regards bearings, and the shorter the time in which a collision can take place; and the converse to this when the slower vessel maneuvers. For example, where A has a speed of twelve knots and B a speed of only six knots, danger of collision ceases at four points on the bow; whereas if A has a speed of only six knots and B has a speed of twelve knots, danger would only cease when B bore abaft A's beam. The time required to avoid a collision in the first case would be less than two minutes, in the second an indeterminately long time.

It is always right to turn as short as you can, and with as little speed.

In explanation of the diagrams, the *advance* is the distance covered to the front in the direction of the original course; the *transfer* is the distance normal to this line, measured to the right or left.

The examination of the diagrams is recommended as worthy of the attention of the officers of steam vessels, as they present some new and interesting features. Unfortunately, however, the different categories in all their bearings cannot be quickly comprehended, and it is a difficult matter to judge correctly of the speed of an approaching steamer, upon the knowledge of which the theory is more or less dependent.

SIGNAL LANTERN.

Owing to the increasing frequency of cases of collision at sea, the present system of side lights has been called into question, and various new plans have been suggested to improve the old ones.

It has been said under the present mode (of one red light on the port side and one green light on the starboard side) the course of vessels under sail is not indicated with sufficient clearness when approaching each other's tack in dark weather, when the hull and spars are not plainly made out.

Captain Heathcote, of Her Majesty's Indian navy, at a meeting of the Royal United Service Institution, as early as 1866, pointed out some of the weak points of the side-light system, and showed, by means of diagrams, how mistakes might take place through a misapprehension of the course of approaching vessels.

The color of lights used is also said to be so weak and indistinct in many cases as not to be easily distinguished at any considerable distance. This is especially the case with the green light.

The plan of carrying two green lights on the starboard side instead of the present single one, the red port-light remaining the same, has been suggested to obviate the danger arising from inability to distinguish the color of lights. Many of the green lights are said to be of a faint bluish shade, not easily discernible, and probably as many mistakes happen from this cause as from defective vision in the observer. This system of double lights would require that the green lights should be placed far enough apart so that they would not blend or run together as one light, which is an objection to nearly all of the systems which show more than one light from the same lantern.

In small loaded vessels the side lights are sometimes placed too near the surface of the water to be seen any distance, and there should be some regulation made to govern the height of the side lights as well as the power of the lights, which might be tested to have the lighting force of so many candles.

It is maintained by some that any alteration in the present law regulating ship's lights would cause confusion, and bring more collisions, for a time at least, than would occur under the old system. This is un-

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doubtedly a good reason for retaining the side lights now in use. It is thought that under the present law greater care was exercised in selecting colored glass for shades, and in having the side lights carefully screened, according to the regulations (see Article III), and unobscured by sails or other intervening objects, fewer accidents would happen to vessels keeping a good lookout. As the United States local steamboat inspectors have no control over sailing vessels, the collectors of customs should see that masters observe the screen regulations, which are, in many instances, reported to be ineffectually enforced.

It is said by many practical navigators that when the regulations governing the present side-light system are carefully observed, it is found to work well. It is simple, and in times requiring action needs but little thought to be quickly comprehended, while some of the new plans proposed might lead to more or less confusion, especially in frequented channels, where so many lights would, it is feared, be liable to be confounded one with another, and thus lead to serious consequences.

Under the rules of the road the principal point for an officer in charge is to ascertain, when he sees a vessel's light approaching, whether it is his place to give way. This point being decided, it is his duty to act promptly, as in these days of rapid speed there is little time to be lost in taking bearings, &c. In fact, it does not matter so much in a dark night whether the approaching vessel is crossing the bow at an angle of one, two, three, or four points, so that the maneuvering vessel acts in time to keep clear.

In this age of invention and improvements, it is impossible to say what the developments of the future may bring to light, but although some of the new plans and suggestions heretofore made may be worthy of consideration, it is thought that great caution should be exercised in any alteration of a system that has now become familiar to sailors throughout the world, and none should be made without the general approval of maritime nations, and even then a year's previous notice should be given of any alteration affecting the commerce of the world.

Some of the European Governments, as well as individual experts, have made inquiries resulting in the conclusion that defective vision is one of the chief causes leading to collisions at sea. Since it has been shown that a red or green light appears to four per cent. of observers like a light of a different color, the importance of the subject is apparent.

But the question of color blindness is as yet unsettled, and the subject is so complicated as to appear to require the attention of experts. In order to give extended control over the matter, international agreements must be made, and the action of Congress in connection with the Governments of other maritime countries would seem to be proper.

In the United States mercantile navy, pilots licensed by the inspectors of steam vessels are tested as to their color sense by the marine-hospital surgeons. No regular examination is required to satisfy the Government of the power and various peculiarities of sight of officers and crews of vessels. There are no requirements demanded in these directions from seamen generally, nor is any standard adopted for the color of the red and green lights, and much confusion and variation ensue, especially in the so-called green glasses, which are said to vary from dark blue to pale or yellowish green.

The local laws of inspectors of steam vessels have placed in their hands red and green glasses, but no authority has been given them to enforce the use of such on vessels under their jurisdiction; and in case of sailing vessels they have no control whatever.

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An account of some of the various suggestions for improving the side lights now used by vessels was given in my last annual report, some of which are undoubtedly steps in the line of advancement.

The plan of Mr. Lidstone, of the Bengal pilot service, with those of Mr. W. G. Stretton, of the English merchant marine, and Capt. Jacob Holm, of the Danish marine, are incorporated here, the two latter as explained in their letters recently published in the London Nautical Magazine.

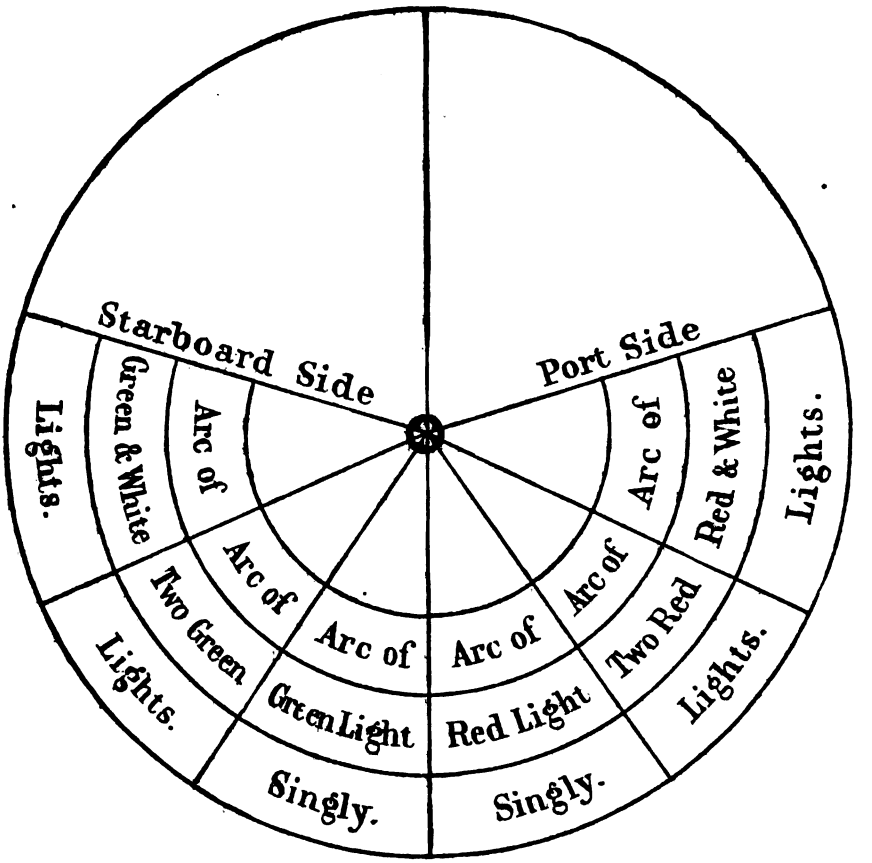

FIG. 11.—Diagram showing the compound light system of Mr. Lidstone.

In view of the numerous suggestions of plans for altering ship's lanterns, which are said to be required by the changing requirements of navigation, and the frequent complaints of mistakes of various kinds, which have led to collisions between vessels, it would seem that the present side lights and their connections will admit of improvement; and it is thought that legislation would be proper calling for international action on this and other subjects bearing upon collisions. Indeed the subject of collisions itself, from any cause, would seem of sufficient gravity for Congress to authorize the appointment of commissioners to meet those of other countries for the purpose of examining the systems of lanterns for use at sea, their screens, the quality of the glass used for same, and their candle-power; fog-signals and steam-whistles; inspec-

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tion of sailing vessels for these objects by Government officers; establishment of sea lanes on frequented routes for steamers; water-tight compartments in iron passenger vessels; the regulation of speed in foggy weather; defective vision in officers and seamen; and such other matters as may be regarded of importance, after a complete and careful examination of the whole question.

I subjoin a resolution upon this subject lately received from the Maritime Exchange of the port of Philadelphia:

Whereas, the numerous disasters caused by collisions of vessels at sea, involving great loss of life and damage to property, in the opinion of the Philadelphia Maritime Exchange demands more care and skill in water navigation: Therefore be it

Resolved, That the honorable the Secretary of the Treasury be requested to invoke the early action of Congress, to provide for the appointment of a commission to be composed of the Commissioner of Navigation as chairman, an officer of the Navy to be appointed by the honorable the Secretary of the Navy, an officer of the Revenue Marine Service, to be appointed by the honorable the Secretary of the Treasury, and six competent persons to be nominated, one each by the maritime exchanges or associations of the cities of Boston, New York, Philadelphia, Baltimore, and New Orleans, and one by the National Vessel Owners and Captains' Association, which commission shall meet in the city of Washington, or at such other places to which they may from time to time adjourn after organization, and make a thorough inquiry into the recent collisions of vessels at sea, with the causes thereof, and into all subjects bearing on the question of collisions and their causes, such as side lights, their screens, and the quality of glass used for the same, and their candle-power, fog-signals, and steam-whistles, the inspection of all vessels for these objects by Government officers, the establishment of steam lanes on frequent routes, water-tight compartments in passenger vessels, the regulation of speed in foggy weather, defective vision in officers and seamen, and such other matters as are referred to in the last report of the Commissioner of Navigation, and to make report to Congress at its next session, with recommendations for avoiding such casualties, and such laws for immediate adoption as may be necessary to carry into effect the said recommendation, as affecting the inland waters of the United States, and the propriety of calling an international convention for the consideration of the subject. The Commissioner of Navigation to receive no increase of pay while serving on this commission, and the officer of the Navy and the officer of the Revenue Marine Service only to receive the highest pay of their respective grades while so serving, and necessary mileage while traveling on this duty; the civil members of this commission to serve without compensation.

THE PILOTAGE LAWS.

In my last annual report a summary of the pilotage laws of the different States was given, and several were cited as in force at some ports, but as being in conflict with those of neighboring States.

House bill No. 999, which was introduced in the present Congress by Mr. Dingley, provides that the local steamboat inspectors may examine officers of sailing vessels not engaged in the passenger trade, and, if satisfied of their knowledge, experience, and skill, shall grant them licenses, for a term of two years, to pilot their own vessels, or other vessels belonging to the same owners, in the waters, ports, or harbors which lie within the limits of the said inspection district. Section 2 provides—

That no sailing vessel taking and having the aid or towage of a steam vessel into or out of any port of the United States, when such steam vessel is in command of a licensed pilot for such port under the laws of the United States, shall be obliged to take any other pilot in any such port, or, declining the offer or tender of pilotage services in such port of any pilot appointed under the laws or regulations of any State, be compelled to pay any fee or charges to such State pilot.

This measure has the hearty support of nearly the entire ship-owning interest of the country, but being in terms a virtual abolition of compulsory pilotage it is as strongly opposed by the pilots. It may be observed, however, that, with the advancing strides that are being made in steam navigation, the compulsory system is losing its importance and gradually becoming less popular. If the bill receives the indorsement

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of Congress it will place the pilotage of American vessels on a free basis and settle a long disputed question for the present at least.

The want of a general pilot law, to apply to all ports of the country, and under which the States might each proceed to establish a pilotage system, the details of which would apply more particularly to their own peculiar variety of climate, coast line, depth of water at the ports, sanitary wants, &c., has long been felt, and it is thought that the lack of such general law (there being none except the general statute adopted in 1789, which continues the regulation of pilotage matters in the hands of local authorities "until further legislative provision shall be made by Congress") should be remedied by Congress at an early day. This will silence the annual recurrence of discussion on the subject arising from the unsettled condition in which the pilots of the different ports are placed.

House bill 4701, of the Forty-ninth Congress, introduced by Mr. Harmer, "to create and establish the pilot service of the United States, and to regulate the pilotage of vessels in the ports and harbors along the sea-coast of the United States," provides that—

The Secretary of the Treasury shall have exclusive control of pilotage matters throughout the country, and that he shall be empowered to organize, equip, and maintain the service, and make and establish rules therefor.

Section 2 provides that the pilot stations shall be arranged into separate classes, according to the depth of water at the various ports.

Section 3 divides the pilots themselves into five classes with superintendents and apprentices, at salaries depending upon their class of from $900 to $1,800 per annum, out of which may be deducted the cost of their clothing and subsistence. The pay, clothing, and subsistence of apprentices are to be specified in the regulations, as well as those of the other persons employed in the service and designated by their rank.

Section 4. Pilots are to be commissioned, and may be transferred temporarily, or detailed from one station to another to secure efficiency. Promotion in the service is to be obtained by advancing to the vacancy the oldest commissioned pilot who has served a regular apprenticeship. Pilots who resign or are discharged may be reinstated without being re-examined.

Section 5. A sufficient number of apprentices are to be appointed for each pilot station, and are to serve six years before being commissioned.

Section 6. Any person who has been for six consecutive years employed in navigation of certain waters may make application to be examined for a pilot's commission to serve as a pilot at the station located thereon.

Section 7 creates a regular board of examiners for each pilot station, consisting of three persons, who shall conduct examinations in accordance with the prescribed rules and regulations, and issue certificates of qualification signed by every member of the board, and file them with the Secretary for his approval.

Section 8. A pilot who has reached the age of seventy years, or who is unable to perform service from disability incurred in the line of duty, may be retired on half the regular pay of a pilot of his class.

Section 9. Pilots charged with violating any of the laws, rules, and regulations of the pilot service, are to be tried before a pilot's court, consisting of three persons, who are to be pilots of the highest class, at the station, as the accused, if such station be one of the five classes; at other stations the court may consist of all pilots or of persons in the employ of the Government, under the Secretary, or of both. The accused is to be furnished with a copy of the charges and specifications before trial, and may be suspended until after trial. On conviction, a pilot may be discharged, suspended, or reduced in rank or class, or deprived of pay, or either, in the discretion of the Secretary of the Treasury. But no pilot is to be discharged, &c., without having been tried and found guilty. A pilot charged with any offense against the United States, or any State laws, may be tried before a court of competent jurisdiction notwithstanding his trial before the pilot's court.

Section 10. Each pilot station is to be in charge of a superintendent, appointed from pilots of the highest class in the port or harbor, who is to settle disputes as to pilotage of vessels to or from his station, receipt for and collect dues for pilotage, and perform such other duties as the regulations or law require. And while superintendent he is to receive his regular pay and such additional compensation as the Secretary may determine. When removed he is to resume the duties of a pilot in the class specified in his commission.

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Section 11. Suitable boats, steamboats or vessels, are to be provided for the pilot service at each pilot station.

Section 12. The Secretary is to fix the rates of pilotage, which are not to be altered, except by him or by act of Congress. Rates of charge are to be one-third less on all vessels registered under the laws of the United States than on similar vessels under a foreign flag.

Section 13. No vessel shall be permitted to depart from the pilot station without paying pilotage dues; or a receipt therefor, or a certificate of their payment, is to be attached to the regular clearance papers of the vessel. Pilotage dues are a lien on the vessel until paid, and payment may be enforced by action against owner, &c., or by libel against the vessel, in any admiralty court in the United States in which the vessel may be.

Section 14. All public vessels of the United States, whether owned or chartered by the Government or any department thereof, are entitled to pilotage free.

Section 15. The master, &c., of any American sailing vessel shall not under any circumstances be compelled to employ a pilot or pay any money unless a pilot is voluntarily taken.

Section 16. Every foreign sailing vessel drawing over 8 feet, when arriving at or departing from a port or harbor in the United States, shall be piloted by a pilot serving at such station, and, when inward bound, if the master shall refuse to take or employ the pilot offering such vessel shall be liable for pilotage whether the master afterwards employ a pilot or not.

Section 17. Every foreign steamer drawing over 8 feet of water must take a pilot from the station when arriving at or departing from any port or harbor in the United States.

Section 18. Every American steam vessel engaged in the foreign trade shall be piloted in and out by a pilot serving at the proper pilot station.

Section 19. Every American steam vessel engaged in towing vessels in and out of any port or harbor in the United States, or in carrying passengers or freight within such ports or harbors, or engaged in the coasting trade, shall in every such port or harbor be commanded by a pilot of that station; but if such vessel be commanded by a licensed pilot no other pilot need be employed.

Section 20 describes a licensed pilot, his qualifications and duties, and the penalties for disobedience of the laws, rules, and regulations by which he should be governed.

Section 21 provides the penalties incurred by any person not commissioned, or the owner, or any one regularly employed on board, who shall pilot or attempt to pilot any sailing vessel in or out of any port or harbor where a pilot station is established.

Section 22 deals with the same class of persons who pilot or attempt to pilot any steam vessel.

Section 23 gives the Secretary of the Treasury power to remit fines and release from imprisonment.

Section 24 gives the President of the United States power to place the whole pilot service, in time of war, under the control of the Secretary of the Navy.

Section 25 provides that the expenses of organizing, equipping, and maintaining the pilot service shall be paid by annual appropriation by Congress.

Section 26 applies the act to the sea-coast of the United States, and to the ports and harbors thereon, and supplies or supersedes all State laws relating to pilotage; but states may pass laws to enforce police regulations in their own ports.

Section 27 repeals all laws or parts of laws inconsistent with this act.

Section 28 provides that this act shall go into effect on the first day of December after its passage.

Section 29 describes the method of carrying into effect the provisions of the act, and empowers the Secretary of the Treasury to purchase such boats or vessels owned by pilots, or pilot associations, as are actually used in their business as pilots.

The plan proposed by Mr. Harmer in the above bill is the best, perhaps, that has yet been framed for the management of a general pilotage system, under the entire control of the General Government. But it has been suggested that the various requirements at the different ports demand a closer local supervision in matters of detail which are likely to arise.

It is also thought that the system would entail more expense than would one in which the more immediate control of the pilots was left to State authority.

The various pilotage systems of the different ports that have grown up under State laws are, many of them, creditable institutions, and their rules and regulations require but little modification, although they seem

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to lack that element of unity which a general law would give. The pilots themselves are recognized as one of our most useful and meritorious classes; and the business of a pilot being to conduct our commerce over bars or shoals, or through channels sometimes intricate and dangerous, where fogs or tempestuous weather frequently prevail, is at once perilous and surrounded with difficulties. The preparation for such a business in many places requires years of hazardous and arduous service.

The pilot's position is one of great responsibility, as after a regular branch pilot is taken on board a ship bound into harbor the master is considered to be relieved from command until she is safely moored in port.

While he is acting as pilot of the ship he has exclusive direction of the course to be followed, and is considered as master *pro hac vice*, the regular master not for the time being responsible for any damage that might be done by the negligence or unskillful navigation of the vessel. Although the introduction of steam navigation has rendered necessary the modification of these fundamental principles affecting the duties and responsibilities of pilots, and the masters of steam vessels hold a quasi command while the pilot is in charge, the fact is, that so far as the navigation of the vessel is concerned the control of the pilot remains the same.

Since the advent of steam navigation the system of compulsory pilotage has been strongly combated, and in many seaports of foreign countries it has been abolished or modified, yet the change has been found to work well. That a strict system of compulsory pilotage is not absolutely necessary to the safety of the navigation of steam vessels appears to be generally admitted; but, on the other hand, it is claimed by the pilots that without some such system their establishments would run down, and leave many of our large seaports without any adequate pilot service. Such a result, though remote, would be bad for the country on more accounts than one. Besides its commercial importance, a good pilotage service is valuable to humanity as the salvors of lives and property. Their regulations compelling a certain number to be at sea at all times, they are often the first to discover wrecks and to succor vessels in distress. As guards of the public health, their usefulness is not less valuable. The pilot is the first to board an inward bound vessel, whether she be from the frozen regions of the north or from the pestilential shores of the tropics, laden with disease; he is the first man to step on board, and if not already so employed, his services might be very valuable in a sanitary point of view.

For these reasons only it might be thought well that a compulsory system of pilotage in a modified form, and placed under the general supervision of the Government, be maintained.

It is suggested that Congress enact a general pilotage law, that will apply to all the ports of all the States, in pursuance of which each port shall be obliged to maintain an efficient pilot service, in return for which commercial advantage compulsory pilotage shall be levied upon all vessels at all the ports, provided that masters and mates of American vessels shall have the option to act as pilots of the vessels to which they belong, in case of passing the examination required for branch pilots at the port in question, and such officers to have the right to apply for such branch, and on evidence of competency such branch shall be granted by the authorities of the port; the rates of pilotage and detention fees to be made according to the vessel's draught or tonnage by the local authorities, but must be submitted for approval by the Bureau of Navigation on behalf of the Treasury.

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Pilots, when employed as health officers, will act under such regulations as the sanitary office of the port may prescribe.

Pilots, while acting as such, may have authority to aid the master in preventing boarding-house runners, crimps, and other persons of similar character from boarding the vessels in their charge, and may have like power for the time being with the master, to make their orders respected.

Of the legislation of Congress relating to pilots, section 4 of the act of 1789 leaves pilots to be governed by regulations under existing State law, or under such laws as the States may enact for the purpose, until further legislative provisions shall be made by Congress.

The act of 1837 enables a master to employ any duly licensed pilot to pilot his vessel in or out of any port upon waters which are the boundary between two States, any law, usage, or custom to the contrary notwithstanding.

The act of July 13, 1866, relating to pilots and pilot regulations of 1866, enacts that no regulations or provisions shall be adopted by any State which make discrimination in the rate of pilotage, or half pilotage, between vessels sailing between the ports in one State and vessels sailing between the ports of different States, or against steamers or national vessels of the United States, and annulling all such existing regulations or provisions.

The provisions of these acts do not conflict with the legislation proposed to be established by Congress for all ports in the United States—a modified form of compulsory pilotage; but the laws and regulations thereunder of some of the States would conflict with the act of Congress and would require revision.

The following is an important decision lately made in reference to the application of the pilot laws of the States when they conflict with those of the United States.

The district court of the United States, Delaware district, in deciding the suit of John S. Rowland *v.* The South Cambria, a libel for pilotage service, sustained the right of masters of vessels bound to the port of Philadelphia to select a pilot authorized by the laws of Pennsylvania, notwithstanding a pilot of Delaware first offered his services.

It appears that on the 22d October, 1885, the British steamship South Cambria, bound from Santiago de Cuba to Philadelphia, when about 20 miles from Cape Henlopen, signaled for a pilot. In answer, the libelant, a regularly licensed pilot under the laws of Delaware, and authorized to pilot vessels of that class, was put on board and tendered his services to pilot the steamship to Philadelphia, he being the first pilot to offer. The master of the South Cambria, refused libelant's offer, under previous instructions of the owner not to employ a Delaware pilot, and subsequently, on the same day, accepted the services of E. L. Davis, a duly licensed pilot under the laws of Pennsylvania, who navigated the vessel to Philadelphia. The master's object was to avail himself of the lower charge for pilotage, the difference in the case being $26.

The libelant sues for $115.50, the amount he would have been entitled to had his services been accepted and performed by virtue of sections laws of Delaware regulating pilots and pilotage in the Delaware Bay and River, passed April 5, 1881 (16 Del. Laws, 496), which provides:

That every ship or vessel propelled by steam or sails, arriving from, or bound to, any port or place, except such as are solely coal laden, passing in or out of the Delaware Bay, by the way of Cape Henlopen, shall be obliged to receive a pilot * * * provided she is spoken, or a pilot offers his services outside of the Cape Henlopen light-house bearing southwest, and if the master of any such ship or vessel, after she is spoken, or a pilot offers, shall refuse or neglect to take a pilot, the master, owner, or consignee of such vessel shall forfeit and pay to any such pilot suing for the same, a

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sum equal to the pilotage of such ship or vessel. * * * "That the pilot who shall first offer himself to any inward-bound ships or vessels shall be entitled to take charge thereof."

The respondent justifies the master's refusal of the libelant's services, and the employment of a Pennsylvania pilot under the act of Congress of March 2, 1837, sec. 4236, R. S., which enacts—

That the master of any vessel coming into or going out of any port, situate upon waters which are the boundary between two States, may employ any pilot duly licensed or authorized, by the laws of the States bounded on such waters, to pilot the vessel to or from such port.

The respondent maintains that the pilotage law of Delaware is invalid where it conflicts with this act of Congress, and that, by virtue of the act, the master of the South Cambria had the right to select a pilot from either State bordering on the Delaware Bay or River without reference to priority of offer by any such pilots,

The judge (Wales) holds that the States have concurrent power with Congress, to pass pilotage laws, until Congress shall take exclusive control of the subject, by the enactment of a uniform law; and in the mean time, all such acts as Congress has made are of paramount authority, and all State laws which are in direct and manifest collision with them must yield. (3 Kent's Com., 390; Cooley *v.* Board of Wardens of Philadelphia, 12 How., 299; *Ex parte* McNeil, 13 Wall., 236.)

Such, also, it may be inferred from the act of Congress of August 7, 1789, section 4, was the understanding of the members of that body. That section reads:

That all pilots in the bays, rivers, inlets, harbors, and ports of the United States, shall continue to be regulated in conformity with the existing laws of the States respectively, wherein such pilots may be, or with such laws as the States respectively may hereafter enact for the purpose, until further legislative provision shall be made by Congress. (1 U. S. Stats., 54.)

The question raised, therefore, is whether the compulsory clause of the Delaware statutes of April 5, 1881, so conflicts with the act of Congress of March 2, 1837, as to be nugatory and to leave the libelant without any right of action.

The judge says:

The question is not entirely new. The waters of Delaware Bay and River are not the boundary between the States of Delaware and Pennsylvania, but it has been held that as these States are coterminous, and border on the same waters, they come within the provisions of the act which was designed to remedy the very difficulty which has arisen in this case. The act of Congress of 1837 grew out of disputes between the States of New York and New Jersey, as to the employment of pilots, New York claiming the right to prescribe that none but pilots licensed under New York laws shall navigate vessels bound to its ports.

In the case of Flanigan *v.* Washington Ins. Co., 7 Penn. St., 311, the supreme court of Pennsylvania recognized the right of a master of a vessel outward bound from Philadelphia to employ a pilot from either of the States of Pennsylvania, New Jersey, or Delaware.

A similar construction of the act was given by the United States district court for the eastern district of Pennsylvania, in The Clymene, 9 Fed. Rep., 164. In that case a Delaware pilot, licensed under the Delaware law of April 5, 1881, had piloted a steamship from the entrance of Delaware Bay to Philadelphia, and payment for his services was refused on the ground that the Pennsylvania law of February 4, 1846, made it an indictable offense for any person to pilot a vessel to Philadelphia without having a license from the board of wardens of that port; hence the contract was illegal.

The court, however, decided that Congress did not intend by the act of 1837 to interfere with the proper exercise of State authority, but to provide against an abusive and hostile exercise of it; that a State could license pilots and make regulations for their government and employment, but could not exclude others duly licensed elsewhere from employment on the public waters of the nation because such waters happened to be within its territorial limits. The precise question was, Did the pilot's

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license authorize him to do what he undertook notwithstanding the prohibitory law of Pennsylvania? And his claim was sustained, on the ground that vessels requiring pilotage might elect whom they would employ. The decree of the district court was affirmed, on appeal, by the circuit court for the district, which held that the act of 1837 applied to the pilotage laws of coterminous States situated upon the same navigable waters, but which are not the separating boundary between them, such a construction being clearly within the meaning of the act. (The Clymene, 12 Fed. Rep., 346. See, also, the Alzena, 14 Fed. Rep., 174.)

The same question was before the United States district court for the district of Oregon. An Oregon pilot, whose services were tendered to and refused by the master of an inward-bound vessel on the Columbia River, sought to recover pilotage fees, because he was the first who had offered, and was entitled under the Oregon law to full pilotage. The master of the vessel employed a pilot licensed under the law of Washington Territory. It was decided that although Columbia River is not a boundary between two "States" in the sense in which the word is used in the Constitution, of a boundary between one such State and an organized Territory of the United States, and that the case came within the mischief intended to be remedied by the act of Congress, and that the master had the right to take a pilot from either Oregon or Washington, without reference to which made the first offer of his services. (The Ullock, 19 Fed. Rep., 211.) The same court, March 26, 1886, passed the same question and reaffirmed. (The Abercorn, 26 Fed. Rep., 877.) The main purpose of the act of 1837 was undoubtedly to neutralize the effect of adverse and conflicting laws of adjoining States, which had, or might assume, an exclusive regulation of pilotage on navigable waters, which are the common, though not the separating, boundary of such States; and no better plan for avoiding or deciding controversies, springing out of such conflicting laws, short of a general and uniform system, could have been devised than the one contemplated by the act, namely, the conferring on the master of any vessel, requiring a pilot, the right of electing who shall serve him in that capacity. This was the object aimed at. The mischief to be suppressed was apparent, and the remedy is equally so.

Such being the meaning of the act, under a fair interpretation of its spirit and terms, and this construction being supported by the adjudication of State and Federal courts, I am constrained to order, that the libel in the case be dismissed, and that a decree be entered for the respondent for his costs.

SALVAGE.

I submit certain correspondence between parties interested in the salvage laws which appear to reflect upon the unjust manner in which some vessels on our inland waters have been treated in respect to claims of this nature.

In view of these alleged abuses it may be well to remark that salvage is the reward given to those who save a ship or the goods composing her cargo from danger, and sometimes has reference to the lives of those on board. The principle was recognized by the maritime laws of Oleron and Wisby and has been incorporated in those of modern states.

The circumstances considered in estimating the value of salvage are: (1) The exertions and peril incurred by the salvors; (2) the skill and alacrity manifested by them; (3) the degree of danger in which the property saved was situated; (4) the value of the property saved.

By the common law of England one who saved goods which the owner was not able to protect or had lost was entitled to compensation for his services depending upon the risk and danger encountered, and might detain them until the claim was adjusted or an action might be brought either by the salvor for his compensation or by the owner of the goods if held after the tender of a reasonable amount for services in saving them. The parties entitled to salvage are those who have by their exertions or by sacrifice contributed to the safety, provided such exertions or sacrifice did not fall within the regular line or course of duty. Thus neither the master nor any of the crew of the vessel in danger have any title to salvage, nor can passengers claim it for any ordinary assistance they may give, but as it is not in the line of duty for passengers to remain on board in time of danger, if by doing so or by any extraordinary ex-

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ertions or sacrifice they contribute to the safety of the ship, they have been considered as entitled to share in the salvage.

If, before the service is rendered, a bargain is made, the amount settled upon fixes the sum to be paid and settles the claim for salvage. So if two ships sail as consorts, as is customary in some trades, with the understanding to render each other mutual assistance, neither can claim salvage for assistance rendered to the other.

All officers and crews of ships of the British navy are under obligation to assist ships in distress, and may receive salvage for their services, subject to conditions expressed in the statute.

The owners of a ship which has saved another are entitled to be reimbursed for expense of stores and other articles contributed as well as for detention, the risk of extra insurance, &c.

The salvage is to be paid by those who would have borne the loss had there been no assistance in proportion to the benefit received. If a ship was in course of earning freight, that must contribute; but it is generally admitted that the wearing apparel of the crew is not liable to salvage.

The line of distinction between salvage and ordinary assistance rendered in cases where there is no extraordinary peril may not in all instances be readily drawn, but must depend upon the circumstances in each particular case. But it is an abuse of a long-established principle for the crews of tow-boats and others in the ordinary pursuit of their business to claim salvage where no present danger is actually threatened.

The vexatious delays of different kinds to which vessels engaged in river navigation are subjected, are referred to in the following letters and may be considered to be of sufficient importance to demand some remedy:

NEW YORK, *November* 23, 1886.

Hon. JARVIS PATTEN,
Commissioner of Navigation, Washington, D. C.:

DEAR SIR: I herewith inclose you a letter I received from Mr. John W. Bryant, secretary, setting forth the manner that the present "salvage" laws are taken advantage of by the inland seamen.

It is plain that the law should be in some form modified and a distinction made in its application as between inland and deep-sea vessels. It seems to make no difference what settlement the owner of the vessel makes with the distressed vessel-owner, the crew, if they are dissatisfied, can proceed on their own behalf, and the courts have so held that they have a right to do so. Under the existing state of affairs, it is difficult to know what to do. If I should meet a friend in distress, and a slight service on my part would relieve him, and, too, without a particle of risk to my vessel or crew, and that friend be a poor man, I asking no pay for the service given by me, any one of the crew who might be dissatisfied could libel and possibly collect, thereby ruining the poor man. It is all wrong.

These inland seamen should not be classified with the deep-sea sailor. They are not hired in the same manner, nor bound in the slightest to us; still they have the same recognition as those that are bound and risk the perils of the seas.

If you can make any mention of it you will be conferring a great boon on the vessel-owners. I also send you a cutting from the New Orleans Times-Democrat of November 15 instant, regarding the evil of the libeling act as it stands to-day.

It stands very much the same as between the inland and the deep-sea vessel as does the salvage act. It is observed that a vessel plying solely on inland waters should be made subject to the same rigid enforcement of an attachment as a vessel going to sea. If one of the large passenger steamers, loaded with her cargo, is about to leave her wharf this p. m., any one of her crew out of pure "cussedness" for a few dollars of pay due him, who would not call at the company's office for it, and the money awaiting him there, can issue a libel and have the vessel seized. Should it be done after the manager had left his office, and bonds could not be procured the night of the seizure, the vessel with her passengers would have to lie at her wharf until the following day, and should the seizure be made on a Saturday night, she would have to lie until the following Monday. The same can be enforced in the case of supplies. If a storekeeper should become aggrieved at a vessel-owner having a small bill un-

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paid, he can vent his spite in the same way by libeling, and it is invariably done at a time when it will give the greatest annoyance.

The law should in some way be made discriminating, and I trust you will do all you can in the matter.

Action was taken at the last meeting of the National Board of Steam Navigation to the end of remedying the evil if possible.

I am, sir, yours, obedient,

ISAAC L. FISHER.
President.

NEW ORLEANS, *November* 16, 1886.

Capt. ISAAC L. FISHER,
President of National Board of Steam Navigation, New York:

DEAR SIR: Circumstances beyond my control, and for which I am sorry, have prevented an earlier answer to yours of the 6th instant, nor have I yet been able to get all of the data referred to in your letter.

Against the law of salvage as applied to happenings upon the high seas there is naught to be urged, but there is against the same construction being put upon those statutes as applied to mishaps upon the inland waters. As interpreted by the United States judge of this district there is absolutely no relative difference between saving a vessel from loss, moored in a harbor, tied to a wharf, or out upon the sea; the same perils are involved and the same rewards are meted out in the one case as in the other, as instance the following: A vessel grounded in the river, safely away from the winds and waves of the Gulf, and yet for pulling her to deeper water salvage was claimed to the extent of $85,000; this for a few hours' work and without the slightest risk to life or property.

Under this law it has been held that in the case of a vessel equipped with special reference to the saving of vessels, or their relief when in distress, whether the same be at the wharf, at anchor in the river, or out upon the sea, that no contract or acts will be held binding as against the crew. In other words, if a special contract is made by the owner with his employés, engaging them by the year at a stated salary, and with the express understanding that those wages are to be in lieu of all rights to salvage, and even if this agreement holds only to mishaps upon the river, even then it will be disregarded and claims for salvage by the crew entertained and allowed. Such a condition was hardly contemplated by the framers of the law; for, as construed, it is an incentive to crime through prearranged fires on cotton-ladened vessels and consequent claims for salvage, as proved by the numerous fires in this port, and in the trial, conviction, and imprisonment of offenders.

Therefore, if the statutes bearing have been literally and not too liberally construed and enforced, they should be changed so as to render impossible such conditions; that is to say, exceptions should be made, and conditions imposed, as to what will constitute grounds for the claim of salvage against a vessel not at sea at the time of the occurrence of a mishap.

Hoping this will answer your purpose in part, if not entirely, I remain as ever,

Yours,

JNO. W. BRYANT,
Secretary.

[Extract from the Times-Democrat, New Orleans, November 15, 1886.]

A BAD CASE.

The City of New Orleans was libeled Friday afternoon at the instance of four of the deck crew for wages claimed to be due. The first knowledge received by Captain Carter of the proceedings taken, was through a deputy United States marshal, who came aboard and notified the captain that he had been ordered to take possession under a writ of seizure. Further inquiry developed the fact that the four men had quit of their own accord, had asked for and had been paid all that was due them, but notwithstanding, they had gone and entered suit for the moneys they had already actually received. The boat was released under bond. Captain Carter had to take on some marble at Gretna, but was compelled to hire an entire new crew for that purpose, every one of those who came down on the boat having deserted her. There is hardly a day but what there is an experience of this kind, and the proceedings had seem to be more summary in this city—upon grounds more frivolous and aggravating, with results more expensive, the steamboatmen claim, than anywhere else. The proposition of the National Board of Steam Navigation to attempt a remedy through Congres of the radical defects in the law governing such proceeding, met with a hearty approval; for as a captain said the other day, "if the board can obtain us relief in this matter, it will do us almost the greatest service imaginable, one for which I certainly will feel most grateful."

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CERTAIN ADVANTAGES ENJOYED BY FOREIGN FREIGHT STEAMERS.

Attention has been called to the operation of the inspection laws as applied to foreign steamers engaged in transient freighting business. By the act of August 7, 1882, amending section 4400 of the Revised Statutes, the intention of the framers of the law was probably that all foreign private vessels engaged in trade to and from ports in the United States should come under the inspection laws; but the amendment reads, "all foreign private steam-vessels *carrying passengers* from any port of the United States to any place or country shall be subject to the provisions of section 4417, &c.," and construing the law according to the letter the result is said to be that the freighting steamer (the "tramp," so called) has an immunity from the regulations requiring an examination which has operated to the disadvantage of the first-class passenger vessels, while the low-class steamer has been able to bring passengers *to the United States* provided she complied with the immigration laws. This discrimination in favor of transient traders, or "tramps," has undoubtedly worked an injury to the merchant vessels under our flag, and especially to those engaged in the West India trade, and it is thought that in justice to our own vessels the law should be amended so as to bring all foreign steamers under its provisions, which now only apply to passenger steamers. It is stated that these transient traders frequently come into the port of New York with passengers, and thence take cattle across the Atlantic, very little pains being taken to clean them before they are again filled with emigrants, while our inspectors are not required to examine them. In a sanitary point of view, also, the change referred to would operate as a benefit.

SECTION 29 OF THE ACT OF JUNE 26, 1884.

The effect of the amendment to section 2776, Revised Statutes, which was adopted by the twenty-ninth section of the shipping act of 1884, is said by some parties interested in the coasting trade to operate as a discrimination against them in certain cases. The law referred to reads as follows:

SEC. 29. That section twenty-seven hundred and seventy-six of the Revised Statutes is hereby amended by adding thereto the following:

"*Provided*, That vessels arriving at a port of entry in the United States, laden with coal, salt, railroad-iron, and other like articles in bulk, may proceed to places within that collection district to be specially designated by the Secretary of the Treasury, by general regulations or otherwise, under the superintendence of customs officers, at the expense of the parties interested, for the purpose of unlading cargoes of the character before mentioned."

It is reported that the bulk of the Canadian plaster which is shipped for ports on the Hudson River in considerable quantities, is carried in Canadian vessels, to the prejudice of our coasters, who are placed at a disadvantage. It is moreover alleged that logwood and other cargo "in bulk" from the West Indies is in the same category, being discharged under the same conditions to the injury of American coasters and lightermen, and the parties making the complaint ask the repeal or amendment of the section referred to.

LOCAL TAXATION ON SHIPPING.

Upon the publication of my last year's report, I took pains to make a thorough inquiry into the operation of local taxation of American ship property in the various States, which was designed to show not only the great irregularities existing therein, but that the result tended to cause

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tonnage owned in one State to be transferred to apparent owners in ports of others where the burden of taxation was lightest or easiest to be borne. Shipping is a floating property, oftener away from its home port than otherwise, it may be for years, and therefore easily transferable, and being extremely sensitive to imposts of any kind, the assessment of even a low State charge would be felt as burdensome.

This year attention has been given to the subject of taxation imposed in foreign countries upon domestic vessels. The question, a complicated one, is as broad as the world itself. Its gravity may be fully appreciated when we see our ship-yards unemployed and our flag disappearing from the seas.

Through the medium of our excellent consular system, with its officers established in every country, and at all the large seaports of the world, the most ample and complete returns have been received in answer to a circular issued by the State Department requesting information on the subject of taxation, whether "general, municipal, or local," and although in some cases the distinction has not been made between taxes known as port charges, which are paid by domestic and foreign ships alike, and a direct property tax known with us as a local tax levied by State, town, or city upon the vessel of the ship-owner residing within its borders and not assessed upon foreign shipping, the returns are most ample, and enable me to present the information clearly and accurately.

GREAT BRITAIN.

No taxes, general, local, or municipal, are imposed in England on domestic ships that are not charged to ships of other nations visiting British ports, with the exception of an income tax. That tax varies somewhat, but at present it is assessed at the rate of 8 pence upon the pound of net profits made by the vessel.

Consul Ross, writing from Glasgow, Scotland, says:

No taxes are imposed upon vessels (nor upon other personal property) in this country. Taxes are imposed upon a merchant's warehouse, and upon his income. The result is that vessels are indirectly taxed if they are profitable but not otherwise.

BRITISH COLONIES.

The same rule is observed in the colonies as in the mother country as to exempting ship property from taxation, but the same regulations do not prevail in all of them.

The consul-general at the port of Calcutta states that no municipal or other taxes are levied on shipping in the ports of Bengal, beyond payments for services rendered, such as light dues, pilotage, and the like.

STRAITS SETTLEMENTS.

The consul at Singapore writes as follows:

Upon due inquiry, I have the honor to report that no taxes of any kind are imposed upon owners of domestic vessels in the British colony of the Straits Settlements; neither within my consular jurisdiction, embracing the ports of Singapore, Malacca, and Penang, which are all "free ports."

The only charge or duty imposed upon the purchaser or his agent (the purchaser is by the laws of the colony required to pay it) is that, when the sale of a vessel, built within or without the colony is effected—sold to any purchaser residing in the colony—he (or several, as the case may be, as future owners) must pay a stamp duty imposed by the laws of the colony for the "conveyance, assignment, or transfer" (this holds good for any kind of property conveyed in writing, on a bill of sale, deed, or like instrument, whether consisting of ships or vessels, floating property, or property on *terra firma*) specified in the colonial stamp-duty manual as follows:

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"Conveyance, assignment, or transfer, on sale of any property except shares in a company. (For shares in a company, there is a different schedule of a less rate.)

"When the amount or value of the consideration for the sale does not exceed $100, stamp duty 50 cents.

"Above $100 and not exceeding $250, $1.50.

"Above $256 and not exceeding $500, $3.

"For every further $250, or any part thereof, $1.50."

So that the stamp duty of a vessel bought in this colony for $10,000 would require on the bill of sale, before it could be considered legal, stamps to the amount of $60.

I know of no other charge or duty imposed by the colonial government or the municipal governments of the three ports, as I do not include the light-dues imposed on the vessels of all nationalities alike arriving at or clearing therefrom.

I submitted the questions in this circular just answered by me to my vice-consul, Mr. Anderson, thinking that he, as a prominent merchant, and as a member of the colonial legislature, would readily inform me upon any point of which I was or might not be aware, and, though he substantially corroborates the foregoing, I nevertheless quote his clear and interesting reply, as follows:

"The settlements comprised in the colony of the Straits Settlements are free ports, in the full sense of the expression, and there are no taxes imposed by the colony upon its domestic vessels.

"The only compulsory charge made upon shipping (foreign as well as British) is light-dues, all ships being made to pay inwards one cent per registered ton, and outwards another cent per registered ton, these dues being for the up-keep and maintenance of the light houses and light-vessels at the Horseburgh Rock, Rabbit and Coney Islands, Cape Rochardo, Penang, Malacca, Formosa Bank, Pulo Penang, &c., all of which are under this government, and benefit shipping of all nationalities.

"In event of sale of a vessel in the colony, the deed of transfer or sale carries with it a stamp duty, the amount of which is regulated by the sum involved. It may be that this may be considered to come within the definition of tax, but I don't think so."

BERMUDA.

The consul at Bermuda writes as follows:

All domestic vessels are assessed and taxed the same as real or personal property, and are so assessed and taxed in the parish where the owner resides; the tax is not uniform in all the parishes, but is seldom less than 6 per cent. and never, or rarely, more than one shilling on the hundred pounds sterling per annum; no other tax of any nature is imposed.

I quote from report of United States consulate at Cape Town as follows:

There are not taxes or rates, either local, municipal, or general, imposed on domestic vessels whatever.

Every hulk or condemned vessel in any port or harbor, not used for storing coal, is taxed until completely broken up, £25 for the first six months, £30 for the second six months, and £35 for every additional six months. This is the nearest approach to a tax on vessels that we have in the Colony.

CANADA.

There appear some discrepancies in the treatment of ship property as regards taxation in the different Provinces and ports of the Dominion of Canada, and I subjoin the statements of the consuls relating to the practice observed in their several districts.

The United States commercial agent at Ottawa communicates the following:

I beg to refer to special report dated June 7, 1886, wherein I stated that I could learn of no taxes being imposed on the domestic vessels of Canada.

By the inclosed printed documents, first, "An act respecting the harbor and river police of the Province of Quebec" calls for a tax of 3 cents per ton register on all vessels, both domestic and foreign; second, "An act respecting the treatment and relief of sick and distressed seamen," of 2 cents per ton. (These taxes are levied as port charges.) I am assured that these are the only taxes imposed, and would respectfully refer the Department to the inclosed letter, written by Mr. McRae to Mr. Hotchkiss upon this subject, and state that Mr. McRae handles the business of more American

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boats than any other person in Canada; also that the letter over his signature is transmitted, out of a deference to his request, without further comment:

"OTTAWA, *July* 6, 1886.

"THOMAS HOTCHKISS, Esq.,
"*United States Consul, Ottawa, Ont.:*

"DEAR SIR: I herewith send you copies of the 'sick mariners' fund' and 'harbor police acts,' which are the only dues collected from boats navigating the Canadian waters, and are collected from domestic as well as foreign vessels. The revenue thus derived is for the direct benefit of those who pay it, and the cost of this branch, or rather these branches of departmental service, costs the Government more than they derive therefrom.

"My object in drawing your attention to these bills is for the purpose of seeing if your Government would not issue a proclamation exempting vessels entering at the port of Rouse's Point, from the 3 cents per ton tax on tonnage, as I am sure that you will agree with me that these dues are not similar to your entirely revenue tax, for which boats really get nothing in return. As I said before, there are no other taxes collected or imposed on boats navigating our Canadian waters, save and except the usual custom-house entry and clearance, which costs $1 each way.

"I sincerely trust you will bring this matter before your Government, as I am quite sure it will only have to be represented to be rectified.

"Any other information you may desire on the subject I will be most happy to furnish. I might say that this move is more in the interests of the American boatman than the Canadian, as the number of each, passing Rouse's Point is largely in excess American, and I might further state that the law as it at present stands, discriminates against the American boats, for the latter, no matter how good a season they may have, can only make five trips; whereas Canadian barges make on an average ten trips, so that you will see that while your boats pay this tax every trip, our barges only pay five and go free five.

"I have the honor to be, your obedient servant,

"J. W. McRAE."

QUEBEC.

Consul Downs writes from Quebec that upon inquiry he had been informed that there is no municipal tax on Canadian vessels by citizens or non-residents, excepting such harbor dues as are levied upon all vessels of all nationalities.

ONTARIO.

Consul Wagner writes from Toronto, Province of Ontario, as follows:

Canadian vessel property at Toronto is taxed as personal property, when owned in this municipality, at the general rate, which varies from 15 to 20 mills per thousand dollars, but cannot exceed the latter amount. In addition to this, ferry-boats pay an annual license fee.

The consul at Hamilton reports:

The only taxes assessed on Canadian vessels at that port are municipal. Vessels are treated as real estate, and are taxed at the place of registry. Taxes on vessel property, as upon real estate generally, are collected on the amount of income received from the property rather than upon the actual value of the property itself. That is to say, a vessel costing $30,000 will be assessed at $1,800, which is the interest at 6 per cent. on the cost value. The owner only pays taxes on $1,800. As vessel property is *far* below par at Hamilton, the assessor generally estimates its value at half its cost, *i. e.*, a vessel costing $16,000 will be assessed at $480, which is the interest on $8,000, the half of its cost. This tax has only been collectible for two years. There are no harbor dues collected at Hamilton.

The consul at Amherstburg, Ont., states:

The Government of Canada imposes no general tax upon domestic vessels. There is a municipal tax upon such vessels, or upon their earnings after deducting expenses, and a fee of $8 per 100 tons is charged for inspecting steamboats and passenger vessels propelled by steam; also a tonnage fee of 1½ cents per ton. Vessels trading with foreign countries pay an entrance fee of 50 cents when reporting inwards, and 50 cents when reporting outwards, if not more than 50 tons measurement, and $1 each way if over 50 tons.

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The consul at Belleville, Ont., reports:

The municipal authorities of that city assess all its domestic vessels, steam as well as sailing, in the same ratio as they do other personal and real property for municipal and general purposes. The property is assessed at its full value, the present rate being about 1¼ per cent.

The commercial agent at Port Hope, Ont., says:

Taxes are both municipal and general, the former of which are as follows: First, the tax is the same as that imposed on personal property, viz, from one-half to 2 cents on $1, the latter amount being the limit of the law, only two-thirds the value of the vessel being subjected to taxation. Second, there is a tax of 50 cents, called the "harbor dues," imposed on all vessels whenever they enter the port. The general tax imposed by the Dominion Government, called the "coasting license tax," amounts to 50 cents annually.

The commercial agent at Goderich, Ont., reports:

The tax on Canadian vessels at that port is simply such as is levied on all forms of personal property. The present rate of such taxation is 1¼ per cent.

The consul at Port Stanley and St. Thomas, Ont., states:

On domestic vessels no general tax is collected. A municipal or local tax at the rate of 12 mills on the dollar is collected at Port Stanley. Domestic vessels have no port charges. American vessels, without reference to tonnage, pay $1 for entering and clearing at Port Stanley. The wages of seamen are from $20 to $25 per month.

The commercial agent at Collingwood, Ont., gives the following items:

Steam passenger vessels.—Municipal taxes: There are none. Tonnage tax: A tax of 4 cents per ton. Inspection fees: An inspection fee of $8.

Steam freight vessels and tugs.—Municipal taxes: There are none. Tonnage tax: A tax of 4 cents per ton. Inspection fees: An inspection fee of $5.

Sailing vessels.—Municipal taxes: There are none.

The above fees and taxes are collected once per year.

There are also "harbor dues" on all vessels.

The consul at Picton, Ont., reports:

All the taxes at present imposed on domestic vessels in this Province are local, or rather municipal. It amounts to about 1 per cent. on half the value of the shipping, whether the ships are at home or abroad. At the present time, on a ship of 500 tons, the taxes would be about $40 per year. There are no other taxes levied in this county on shipping.

NOVA SCOTIA.

The consul at Windsor, N. S., reports:

The only taxes assessed on vessels in this district are the local taxes, including poor, school, and road rates. New vessels are valued at $30 a ton, and are taxed on one-half that valuation, 10 per cent. being deducted each year as they advance in age, making the tax very low, as the rate is about 1 per cent. a year on the general valuation.

The commercial agent at Yarmouth, N. S., writes:

There are no provincial taxes of any sort placed on domestic vessels. The only local or municipal tax is one imposed, not on the whole of, but upon one-half of, the value of the vessel, the amount of the tax varying in different municipalities. It is about 1 per cent. in Yarmouth.

NEW BRUNSWICK.

The consul at St. John, N. B., states:

The rate of taxation the past year on vessels, the property of resident owners, registered at this port, was at the rate of 1¼ per cent., and the average rate of taxation for the past ten years was about 1 per cent. This includes all taxes on vessels, general, municipal, local or otherwise. Vessels owned by non-residents and registered at this port are not subject to taxation. Vessel property is assessed at about three-fourths of its value.

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The commercial agent at Moncton, N. B., says:

The only tax collected on domestic ships is 2 cents per ton, marine dues, for the benefit of sick and disabled seamen.

PRINCE EDWARD ISLAND.

The United States consul at Charlottetown, Prince Edward Island, gives the following taxes imposed on domestic vessels by the general Government at Ottawa, viz:

Up to 50 tons	$0 50
From 50 to 100 tons	1 00
From 100 to 200 tons	1 50
From 200 to 300 tons	2 00
From 300 to 400 tons	2 50
From 400 to 500 tons	3 00
From 500 to 700 tons	4 00
Over 700 tons	5 00

FRANCE.

It appears that in France no special tax is levied on French shipping in excess of such port charges as are common to vessels of other nations, excepting the *patente d'armateur*, or ship-owner's license, the charge for which varies in different ports, and some minor expenses for stamps, *droits de Francisation*, &c.

Consul Roosevelt, of Bordeaux, gives the import tax paid to Government on vessel property of foreign origin, entire or in part, coming into the district for domestic use, as 39 cents per ton.

Naturalization tax.

Vessels below 100 tons pay Government exclusively	per ton	$0.02½
Vessels 100 to 200 tons	per vessel	4.17
Vessels 200 to 300 tons	per vessel	5.56

Vessels 300 tons and above, $5.56 per vessel and $1.39 extra for each 100 tons over. The fractional part of 100 tons is rated as a whole.

General and conventional tax to Government.

Ready for service:		
Wood or iron steam vessels	per registered ton	$0.39
Wood or iron sailing vessels	do	0.39
Hulls of wood or iron vessels	do	0.39
River boats of all dimensions (wood)	do	1.39
River boats of all dimensions (iron)	do	7.72
To be taken aport:		
Wooden vessels	do	0.06
Vessels sheathed with metal	do	0.15

Government fishing tax.

Pilot boats are permitted to fish without taxation. As a means of precaution, the permit must be renewed yearly. Fishing boats not exceeding 50 tons, and plying their trade exclusively off the French coast, pay a tax of $1.39 per vessel; of 30 tons exclusively, 70 cents per vessel; above 30 tons, with deck, 70 cents per vessel; above 30 tons, without deck, 23 cents per vessel.

Boats constructed with the hold partially covered are rated as without deck.

The United States consul at Nantes writes that there are no taxes upon ships except the *patente d'armateur*, or ship-owner's license, which is a municipal tax and varies in different French ports. At Nantes and St. Nazaire it is 2 cents per register ton.

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SPAIN.

There are several fees and dues levied on Spanish vessels by the Government, which amount in the aggregate to a considerable tax.

The United States consul at Barcelona gives them as follows:

(1) *Flag tax.*—All vessels on being registered under the Spanish flag pay 12½ pesetas ($2.50) per metric ton.

(2) *Industrial and commercial tax.*—All vessels pay annually 1 peseta (20 cents) per ton register up to 500 tons, the maximum.

Consul Marston, of Malaga, states the annual tax on vessels in that port to be 4 reals per ton of whatever size, up to 500 tons.

A municipal tax of 16 per cent. of the 4 reals per ton is levied, besides 6 per cent. of total annual taxes, for expenses.

With regard to taxes on shipping in the Spanish colonies, I gather from different consular reports that similar taxes are generally assessed.

In most of the ports of Cuba a tax is collected from coasting schooners of 50 cents per ton.

At Cardenas the municipal and city charges and custom-house expenses amount to $146 for vessels of 150 tons. For launches, the municipality tax is about $10 per annum.

At the port of Manila, Philippine Islands, there is a navigation tax levied of 8 cents per ton, which is abated in steamers after running coastwise one year.

Consul McKay writes from Teneriffe, Canary Islands, in relation to charges and restrictions on Spanish vessels in the colonies as follows:

There are certain indirect taxes on imports originating in the octroi-tax law, of which it is impossible to give the figures, as they depend upon the quality and quantity of food a vessel takes for provisions, all eatables and drinkables (except water) paying consumption duties on board vessels on the same tariff rates as established on shore. This is a particularly irritating impost, as no allowance is made for consumption upon the high seas, and it is applied to foreign and Spanish vessels alike.

The effect, however, is to throw the greatest burden upon foreigners, as the captains of Spanish vessels, through their knowledge of the coasts and their acquaintance with the tax officers, as also the weak points of the law, are enabled to avoid to a great extent this impost.

There appears to be some authority under the law for collecting this tax on the provisions a vessel brings into the port, but no attempt has been made to enforce this view, the taxes referred to being recovered only on such provisions as the vessel takes in port.

For the protection of Spanish ship-builders any repairs a Spanish vessel may undergo in a foreign port should be reported on arrival at a home port, and a percentage is assessed on the amount expended, which goes into the general treasury.

I would also call your attention to a bounty of 40 pesetas ($8) per ton on vessels built in Spanish waters, on all vessels over 130 tons, paid by Government on the vessels showing their sea-going qualities by making a voyage to America or Asia.

PORTUGAL.

The following are the charges levied upon domestic vessels by the Portuguese Government:

	Reis.
For enrolling or registering Portuguese vessels	8,300
Additional on first 50 cubic meters	3,000
Additional on 50 to 100 cubic meters	7,000
Additional on 101 to 200 cubic meters	10,000
Additional on 201 to 300 cubic meters	15,000
Additional on 300 and upwards cubic meters	23,000

ITALY.

Consul Fletcher writes from Genoa, May 31, 1886, as follows respecting local taxation of ship property in Italian ports:

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On investigation I find the subject of taxation in Italy somewhat complicated, but sifted of its roundabout, winding methods, which was only learned after much patient inquiry, what is herewith submitted may be considered reliable.

In Genoa sailing vessels are taxed according to the length of time in service and the profits presumed to be made annually by their owners. The basis of general assessment established by the Italian Government is as follows: Vessels not over six years in service are supposed to earn a net profit of 5 per cent. over their insured value; vessels in service over six years and not more than twelve years, 2 per cent. net gain; and all over twelve years, 1 per cent.

A vessel, therefore, of the first category, insured, say, for $30,000, is presumed to yield its owners a net annual income of $15,000. A vessel of the second class, as above quoted, insured, say, at $12,000, is supposed to earn for its owners $240 clear of all expenses. Proceeding as before to the third class we find the vessel insured for, say, $6,000; this at 1 per cent. gives $60 taxable funds.

On these estimated profits the Government allows a reduction of 25 per cent., consequently only three-fourths the presumed earnings are taxed.

The general Government tax is 13.20 per cent. A vessel, therefore, of the first class, say, whose net earnings amount to $1,500, less 25 per cent., pays a Government tax on $1,125, 13.20 per cent of which, or $148.50, goes into the national exchequer. The following figures illustrate the case more clearly: Granted the vessel has earned a net profit of $1,500; deduct therefrom 25 per cent., or $375; net taxable profits, $1,125; 13.20 per cent. on $1,125 equals $148.50.

The assessment of a vessel remains unchanged for two years.

Owners of vessels also pay a municipal tax, varying from $4 to $10, annually, according to the value of their sea-going property.

The master of a vessel pays $54, and mate $6, Government tax annually.

Steamers are not assessed after the manner of sailing vessels; the *modus operandi* is as follows: Managers of steamships and Government collectors hold biennial meetings, at which a supposed exhibit of the expenditures, repairs, and net earnings of each company is presented and discussed. It is then and there agreed what round sum should be paid the Government annually for two years, said agreement to include the taxes which should be paid by managers, agents, captains, mates, and others in the employment of the companies, who are liable to taxation. In this assessment it is the intention of the Government that the amount paid by steamships shall equal the taxes collected from sailing vessels, to wit, 13.20 per cent. of the net earnings.

In their turn managers of steamers tax their employés in the following manner: A captain contracts to work for, say, $60 per month; instead of this sum, however, he is only paid $52.08, the balance, $7.92, being 13.20 per cent. of $60, is retained by the company for Government tax.

Owners of steamships pay a municipal tax varying from $10 to $60 annually, according to the value of their property.

Consul Camphausen, of Naples, writes:

The income tax on the exercise of the maritime industry, according to the law of August 24, 1877, No. 4021, is 13.20 per cent. on the net profit, and is assessed by the tax agent on the basis that profits or increase on vessels during the first five years after their construction, amount to 5 lire for each and every ton register, and after that period to 1 lira for each and every ton register.

The reason for the reduction of the income tax after the first five years is the presumable expense of repairs.

By the law of July 20, 1861, No. 132, there is also an annual tax of 5 lire imposed for the verification of the scales or weighing-machine carried by vessels.

In this province there are no special taxes on the mercantile marine.

The consul at Messina writes as follows:

All Italian bottoms pay an income tax of 14 per cent. per annum. This tax is excessive and is evaded to some extent by ship-owners, who come to an understanding with the surgeons. Thus vessels that are classed A 1, that are less than 10 years old, are taxed from $1.54 to $1.93 (in Italian currency from 8 to 10 lire) per ton profit, and vessels more than 10 years old, classed $\frac{A}{B}$ 1.1, are taxed 96 cents to $1.15 per ton profit. From the gross assessment 25 per cent. is deducted, and the tax is levied upon the remaining 75 per cent. For example, an A 1 vessel of 600 tons register is assessed at 6,000 lire (in this instance at $1.93, or 10 lire per ton profit), less 25 per cent. = 4,500 lire, upon which sum the 14 per cent. income tax is levied. Of the 14 per cent. income tax 13½ is the general Government tax, the balance the provincial tax. The rate of taxation varies but little in the different provinces. With steamers no evasion of the income tax is possible, as they are generally owned by fruit stock companies, whose balance sheets must be published.

Sardinia.—I beg to state that no local or municipal taxes are imposed here on domestic vessels.

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AUSTRIA.

All vessels, except smacks, used exclusively for rural transports (market produce) and fishing purposes, are subject to the taxes on trade, viz:

Vessels.	Taxes.	Vessels.	Taxes.
	Florins.		*Florins.*
1 to 5 tons	2.10	401 to 520 tons	42.00
6 15 tons	3.15	521 650 tons	52.50
16 30 tons	4.20	651 780 tons	63.00
31 50 tons	5.25	781 950 tons	84.00
51 90 tons	8.40	951 1,200 tons	105.00
91 140 tons	10.50	1,201 1,600 tons	157.50
141 200 tons	15.75	1,601 2,000 tons	210.00
201 280 tons	21.00	2,001 and more	315.00
281 400 tons	31.50		

To the above-mentioned taxes is added the additional Government tax of 70 per cent. on the tax up to the amount of 50 florins and of 100 per cent. on larger amounts.

Vessels of a larger tonnage, *i. e.*, those subject to a tax of 10.50 florins and more, have to pay, besides the taxes on trade, income tax.

This last tax, which is calculated on the basis of returns and notices to be given every year by the owners of vessels, is 5 per cent. on the average net income during the last three years, as appears from the income and expenses returned by the owner and rectified by the Government commission.

From this income tax must be deducted, however, the trade tax separately assessed in such manner that to thus reduced taxes must also be added the additional Government tax in the above-mentioned proportion.

Vessels belonging to companies, incorporated or otherwise, are not taxed separately, but the whole income of the company is taxed according to their statutes or agreement and balance sheets.

The above-named Government taxes serve also as the basis of assessing and collecting additional per centum taxes by the provinces, parishes, chambers of commerce, &c., in case their incomes should not be sufficient to cover expenses.

At Trieste both these taxes on trade and income are collected for the present only as income tax, and amongst the now Government additional, there exists only that of 25 per cent. in favor of the parish of Trieste.

The payment of the taxes on trade is due in two half-yearly advance payments, and that of the income tax in four quarterly post-payments.

HOLLAND.

Consul Eckstein, of Amsterdam, writes, with reference to taxe son ship property in Holland, that he ascertained from the proper officials that neither the Netherlands Government nor any of the municipalities of the country imposes any tax on domestic vessels.

When a Dutch citizen purchases a foreign ship there is a registration tax of 3 per cent. on the amount, besides which there are certain trifling expenses for stamps required at the transfer of ownership.

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RUSSIA.

The tax upon vessel property in Russia is not assessed upon the value. Consul Young writes from St. Petersburg that there is a tax upon all vessels on the waters embraced in the government of St. Petersburg, that is to say, on the Neva, from Cronstadt to Lake Ladoga, of 85 rubles each. This tax is levied by the provincial government of the provinces, and is different in each province, but nearly approximates this sum, which is equal in American currency to $45 per annum for each vessel, irrespective of size or capacity.

The tax on shipping at Russian ports on the Black Sea is about the same, although applied differently. At Odessa coastage dues are sanctioned on Russian vessels, while at Kherson they are exempt.

SWEDEN.

According to statements received from the United States consul at Stockholm and at Gothenburg, ship property in this country is taxed for the Government, the community, and the church, these taxes being calculated according to the profit the vessel has made during the year, amounting to an income tax. In the port of Gothenburg, for instance, a ship which has earned 2,000 kroner during the year will have to pay about 122 kreuzers taxes in all.

GERMANY.

No separate rates or taxes are imposed on domestic vessels by the Governments of the maritime states (Prussia, Oldenburg, Lubeck, Bremen, and Hamburg). Vessels brought under the German flag, whether built in home or foreign yards, have merely to pay the measurement and registration fees. The former are levied in accordance with the ordinance dated July 5, 1872, and amount to 5 pfennige (about 1⅛ cents) per cubic meter, but never exceed 2 marks (equal to 47½ cents).

The fees for registration of ships at Hamburg are 9 marks (equal to $2.14). In the maritime states (Prussia, Mecklenburg, Oldenburg, Bremen, and Lubeck), they vary from 9 to 40 marks (or $2.14 to $9.52), according to the tonnage of the ship.

In some German ports there is assessed a municipal tax of half a cent per ton, as at Stettin, where quay money is levied on arrival, but it is applied to foreign as well as domestic craft.

GREECE.

An industry tax is levied upon all Greek vessels, excepting those registered in the Ionian Islands as follows (per annum):

Vessels.	Dr.
10 to 50 tons	10
50 to 100 tons	25
100 to 200 tons	40
200 to 300 tons	50
300 tons and upwards	60

BELGIUM.

The Belgian Government is very liberal in the treatment of its shipping in respect to local taxation. Consul Steuart writes from Antwerp,

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saying that "no direct taxes are levied upon vessels. The register is given gratis, and the expenses for stamping and recording it are light."

DENMARK.

According to advices received from the United States consul at Copenhagen no tax is assessed on vessel property built in that country. Only in case of ships built in or brought from foreign countries, no matter whether old or new, there is a duty of 3 per cent. upon the cost, according to building contracts or bill of sale, on steamers or sailing vessels, when of iron, steel, or oak materials, and 2 per cent. on vessels built of fir wood.

The consul at St. Thomas reports that no tax whatever is imposed on Danish vessels registed by the proper local authority in the Danish West Indies.

MEXICO.

The United States consul at Tampico writes that he has visited all the parties owning vessels and water craft at that port (fifteen in number, varying from 20 to 86 tons measurement), and is informed that at this time there is no tax, either federal or State or municipal, on capital invested in vessels, whatever be their class or use. There was formerly a tax of one-half of 1 per cent. on the value of Mexican property, with some other charges which no longer exist. The consul at Acapulco writes that there is levied at that port a federal tax (*derecho de patente*) on Mexican vessels of 30 tons or over of $16, and under 30 tons $4.

CHILI.

The Chilian Government levies port charges on national and foreign vessels alike. A license to navigate, which costs from 1 to 10 cents per ton, is assessed on Chilian ships according to their size and employment

BRAZIL.

Judging from the report of Consul-General McCall, at Rio Janeiro, there are no taxes assessed upon Brazilian ships in the ports of that Empire excepting such as are paid by foreign vessels. I also copy from the letter of Consul Weaver, of Bahia, as follows:

In reply to your circular of the 16th March, I beg to state that, from the best information, the owners of ships are subject to no taxes, either general, local, or municipal, except as port charges, and that the owners of vessels under the flag of Brazil are exempt from the most of these.

When informed that port charges was the only tax paid by the domestic vessels of this Empire, I made the inquiry, What taxes are paid by foreign and what by domestic vessels on entering the harbors of Brazil?

I inclose the answer, in Portuguese, showing that whilst foreign vessels pay port charges and hospital charges, domestic vessels only pay hospital charges, being exempt from port charges.

PERU.

The following charges are collected on domestic vessels of over 200 tons sailing under the Peruvian flag:

For issue of register, 20 soles silver; for sailing license, 2½ soles silver; besides port charges, which are paid alike by vessels domestic and foreign.

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ECUADOR.

In Ecuador there is no local tax on domestic vessels. The general Government collects a ship tax every two years on vessels of over 10 tons, varying from $3 to $12 each, up to 300 tons, and $16 on vessels above that size.

ZANZIBAR.

Consul Cheney writes that "no taxes are imposed on vessels" by the Government of the Sultan of Zanzibar.

JAPAN.

In the Empire of Japan there is a general Government tax assessed on domestic vessels at the rate of 2 yen to 15 yen per vessel, according to size, and 30 to 50 sen for boats.

There is also a municipal tax at some of the ports, which varies in the different cities.

I copy from the letter of Consul Jernigan, of Osaka and Hiogo, on the subject:

> Domestic vessels in Japan pay only a Government tax, which is collected at the following rates: Steamers, 15 yen per 100 tons register per annum; sailing vessels, 10 yen per 100 tons register per annum.
>
> Vessels of Japanese form of construction, measuring above 50 kokn (1 kokn equal to 5.13 bushels), 2 yen per 100 kokn, and vessels of Japanese form of construction, measuring under 50 kokn, 0.30 yen each vessel per annum.
>
> For your further information, I make the following statement showing the total amount of taxes collected by the Japanese Government from domestic vessels during the fiscal year ending June 30, 1885:
>
> Steamers, 200.92 yen; sailing vessels, 975.55 yen.

Vessels of Japanese form of construction:	Yen.
Above 50 kokn measurement	4,070.53
Under 50 kokn measurement	4,822.65
Total	10,069.65

The reports of the consuls, and the foregoing statements compiled from them, show that our ships engaged in the foreign trade are, as a rule, taxed heavier than the world's shipping outside the United States; and it is an axiom in commerce that whenever the burden of a tax is imposed upon the instruments of competition, while competition itself is left free and unburdened, that burden not only reacts adversely on the profitable use of those instruments, but cripples the spirit of enterprise which employs them. Thus, in the world's foreign trade, an American ship is one of the great agencies of distribution; and its duty is to gather its cargo of home productions for consumption abroad, and to receive in exchange its cargo of foreign commodities for disposal in the same manner in the best market it can find. So that really this instrument of distribution having once gone abroad, may be kept abroad and never return, or only at long intervals, to its home port.

Now, it is clear that the State from which she started and where the owners reside can extend to her but little, if any, protection while on her voyages performing these important functions; and therefore it would appear that there was but little ground or reason to justify imposing a tax. Moreover it does not seem, under the circumstances, as if the tax was laid by the proper hand. States that tax ship property engaged in trade abroad at the same rate that personal property on land is taxed, fail to recognize the fact that that property is not present as the other is, and could not be present if its legitimate value for the

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purposes of taxation was to be ascertained. If a ship is an instrument of trade or for the distribution of products, it is of no value when kept in its home port; but it represents one of the world's increments of profit when employed. But she should not be subject to tax while in such employment, but rather on what she earns. If she was not away from the State where owned, she would earn nothing, and she would depreciate faster in value from her inactivity. But when she is absent the value of her earnings may be known; and it is held that she should be taxed on that amount and not the amount of her entire value. This would avoid taxation upon years of positive loss. In other words, it is proposed that Congress under the Constitution shall regulate by law the taxation of such ship-property instead of the State, if a tax thereon should be necessary, leaving to the State the power of taxing the income or earnings of ships engaged in such trade, to which the owners would probably have no objections.

It is evident that if the foreign maritime nations with which we are competing for the ocean carrying trade do not subject their shipping to a property tax, this country cannot afford to do so. The constant operation of such a discrimination against our shipping interest would be sufficient in view of the immunity enjoyed by foreigners from such burdens to weigh it down so as to prevent a complete restoration of our sea-going tonnage.

Congress undoubtedly has power under the Constitution to relieve vessels engaged in foreign and interstate commerce from the various forms of State and municipal taxation, but whether such a course would be in strict conformity with some of the decisions of the courts has been doubted, and, considering the conflicting opinions that exist on the subject, probably the most expeditious way to obtain the desired relief would be for the several States to act promptly in the matter (as some have done already) and exempt vessels engaged in foreign trade from local assesments for tax on the property.

SHIPS AND OWNERS.

Questions relating to ownership of vessels and the transfer of ship-property, all of them more or less complex and difficult, are often pro pounded to the Commissioner of Navigation.

Our system of rules governing matters relating to ships and owners is a branch of the maritime laws respecting seamen, charter-parties, salvage, average, &c., the elementary principles of which were handed down from the ancient Rhodian laws and adopted in part at least into the legislation of Rome.

In more modern times there appeared the celebrated *Consulate del Mare;* followed by the Rules and Judgments of Oleron; and in the north, the Laws of Wisby; and in France, the Marine Ordinances of Louis XIV—the spirit of which has been engrafted into the codes of most commercial nations, and forms the basis of our maritime jurisprudence.

Many changes and modifications, made necessary by the varied demands of modern commerce, have been incorporated in most countries; and in the United States a mass of statutes have been accumulating more or less in conflict with each other, and often not in harmony with the earlier established maritime principles.

Although the Constitution vests with Congress the power to regulate foreign commerce and shipping matters generally, the States have as-

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sumed these powers to some extent, and no successful attempt has yet been made to form a maritime code, or a distinct body of commercial statutes for the entire Union.

According to the accepted interpretation of English and American laws a ship is personal property, and is, where not modified by statute, subject to the rules prevailing in relation to other personal property. The United States statutes require that the name of every registered ship, and the port to which she belongs, be painted on her stern on a black ground in white letters of not less than 3 inches in length, under penalty of $50.

Ownership may be acquired by causing a ship to be built. Generally, if a ship is built under contract, the property in it, like that of any other thing not existing at the time of the order, does not vest in the party ordering it until finished and ready for delivery. But the time of the property vesting is determined by the intention of the parties as expressed in the contract; thus, if their price is paid in installments during the progress of the building, the payment of those parts of the price vests such a proportion of the property in the buyer during the course of construction, and, therefore, as between him and the builder, he is entitled to have that same vessel when completed.

A ship being personal property, her owner's interest goes after his death to his personal representative as a part of his estate. It may be sold from owner to owner to any extent, and under certain circumstances may be sold by the master.

It is customary to require of the seller a written bill of sale to accompany the purchase of ship property. The bill of sale from the builder or original owner is called the grand bill of sale, that from any subsequent owner the ordinary bill of sale.

In Great Britain, by act of Parliament, each ship is considered to be divided into sixty-four parts, and the interest of the owners is represented by one or more of such parts. More recently, under the companies act of 1862, a vessel may be held in shares of any amount with limited liability. In the United States none of these regulations exist. With us, a ship may be owned by any number of persons, and in any proportions.

The presumption is, that the owners hold their several shares or interests as tenants in common, and not as partners. When a ship, or any part of a ship, is owned by two or more persons in partnership, either of the partners may dispose of the ship, or shares held by them, like any other property owned in partnership. But when the owners hold their shares as tenants in common, each owner may sell his own share, but cannot sell the interest of any other owner.

The question whether the ship is owned by the different proprietors as tenants in common, or as partners, is determined, as in all other cases where personal property is owned by more than one person, by the circumstances of the case. The presumption is that a vessel is owned by the parties as tenants in common and not as partners. This presumption must be overcome by facts which show a community of interests in her management and employment, incompatible with anything but a partnership. Where two persons, owning a ship in equal shares, united in sending her to a foreign port with a cargo purchased on joint account to be sold with the ship and reinvested in another adventure, it was adjudged that they owned the ship as partners. By an act of Congress approved July 29, 1850, it is provided that no bill of sale, mortgage, hypothecation, or conveyance of any vessel, or part of any vessel, of the United States shall be valid against any person other than the

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grantor, or mortgagor, his heirs and devisees, and persons having actual notice thereof, unless such bill of sale, mortgage, hypothecation, or conveyance be recorded in the office of the collector of the customs where such vessel is registered or enrolled; provided that the lien by bottomry on any vessel, created during her voyage by a loan of money or materials necessary to repair, or enable such vessel to prosecute a voyage, shall not lose its priority, or be in any manner affected by the provisions of the act. The act further provides for the manner in which the record shall be kept and authenticated, and requires—

That the owner, or agent of the owner, of any vessel of the United States, applying to a collector of the customs for the register or enrollment of a vessel shall, in addition to the oath now required by law, set forth in the oath of ownership, the part or proportion of such vessel belonging to each owner, and the same shall be inserted in the register or enrollment; and all bills of sale of vessels registered or enrolled shall set forth the part of the vessel owned by each person selling, and the part conveyed to each person purchasing.

The act does not declare a sale that is not recorded to be void as between the buyer and seller, or as regards persons having notice of it, and leaves the presumption of the law as it exists respecting an oral sale, and delivery being valid between the parties; still a common degree of prudence should induce the purchaser of a ship, or of an interest in one, to require a written bill of sale and have it regularly recorded. In most cases ships are owned by more than one person in specific shares. In such instances it would be impracticable to make actual delivery of an undivided share, and the importance of having documentary proof of the ownership, to which reference may be had in case of need, is obvious. When a ship is sold abroad by the master, a power of attorney should be sent him by each of the owners separately to enable him to convey the vessel on their behalf in a legal manner; for although there is no clause in the acts of Congress requiring the assent of all the owners to the transfer of a part of a registered ship to a foreigner, it is presumed that the owners will act together in such a matter. Besides every such transfer, whether by way of trust or confidence, must be made known, as otherwise a forfeiture of the ship is incurred. A transfer, even for the purpose of evading the laws of a foreign country with an understanding that the vessel is afterwards to be reconveyed to the former owner, works a forfeiture unless made known as prescribed by the act of March 2, 1803.

When a ship is mortgaged the recording required by the act of Congress does not supersede the further necessity of a compliance with the laws of a State which require mortgages of personal property to be filed.

In the State of New York a statute in relation to the mortgages of personal property requires that the mortgage, or a copy thereof, must be filed in the office of the county clerk where his office is held, in the place of residence of the mortgagor, and, if he reside in a town where there is no such office, in the town clerk's office of such town.

By acts of Congress ships built within the United States after July 4, 1776, and such as may have been captured in war by citizens and lawfully adjudged as prizes, and such as may have been forfeited for a breach of the laws of the United States, when owned by a citizen or citizens, may be registered and recorded as ships of the United States and are then entitled to certain privileges under the navigation laws which foreign ships do not enjoy. The law requires evidence to be furnished to the collector of the district where the registry is made of the origin and ownership of the vessel, together with a description of her various measurements and particulars, for her identification,

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In case the ship is sold the original registry is surrendered, and if intended for foreign trade a new one must be taken out by the new owner.

Instead of such registry, however, where a ship is employed in the coasting trade, or fisheries, she must be enrolled and licensed. Registered ships which have been captured and condemned under the authority of a foreign power, or sold to a foreigner, lose their character as American ships, and cannot be again registered, although they again become the property of American citizens.

There are occasionally cases of extreme necessity in foreign ports where the commercial law of maritime nations recognizes the right of the master of a ship to sell her. But to warrant such a sale and to enable the master to give a good title to the purchaser, the vessel must be in such a condition from damage and necessity of repairs, that the owner, if he were present, with all the means at the master's disposal, would not in the exercise of a sound judgment deem it prudent to put the vessel in repair necessary to bring her home. It is said that the master has, by virtue of his employment, not merely those powers which are necessary for the navigation of the ship and the conduct of the adventure to a safe termination, but also a power, when such termination becomes hopeless, and no prospect of bringing the vessel home, to act for the best under the circumstances, and therefore to dispose of the ship and even of her cargo in case of necessity, when nothing better can be done for the benefit of all concerned. Consequently, when a ship puts into a foreign port in an unseaworthy condition, at which she cannot be repaired without an expenditure which would cost as much as the value of the ship when repaired, or if the master has no money to pay for her repairs, and cannot, either by hypothecating the ship or the cargo, or by selling the cargo, raise moneys to repair her, so that a prudent owner would not hesitate to sell her, the master may properly sell her. But if he can by hypothecating the ship or cargo, or by selling the latter, as he may in case of necessity obtain the money required to put the ship in order to complete her voyage, he should do so, unless the expense of the repairs will exceed the value of the ship when repaired. The title the master gives is subject to the risk of the purchaser, being compelled to show the necessity of the sale. It is not sufficient that the master acted in good faith, or that he employed surveyors who examined and reported that the vessel was so injured as to render it unseaworthy and not worth repairing; but it must be shown that the circumstances are such as to amount to a moral necessity to sell her. In the present day, however, when the electric telegraph cables permit of rapid communication between nearly every port of the world, cases where a master may take such extreme responsibility upon himself are more rare than formerly, as a master is rarely obliged to resort to it now without advice from the owners or insurers.

In a proper case for such jurisdiction the sale of a ship may be made under a decree of an admiralty court, when the title is equally good. Title may be acquired in this way in cases of capture in time of war, or seizure for violation of acts of Congress in relation to customs and navigation laws. A vessel, or part of one, may also be sold upon an execution issued out of a court against the owner, in the same manner as other personal property. If a ship is sold while upon a voyage or in a foreign port, the buyer should at once cause the bill of sale to be recorded, as required by the act of Congress of 1850, in order to make his title clear as against any subsequent purchaser, mortgagee, a cred-

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itor of the seller, and he should, without unreasonable delay, take possession of her upon her arrival in port.

Ship's husband.—When a ship is held by part owners, and they all agree, it is customary to intrust the management to one of their number, who is called the ship's husband. Under such an understanding he is the agent for all the owners, and his acts in pursuance of his duties are binding on the other owners.

Where the owners of a ship have constituted one of their number the ship's husband, his acts in employing officers and seamen, in repairing, equipping, and purchasing an outfit for a voyage, in procuring freight, and chartering the ship are binding upon all. It is within the scope of his agency to receive and disburse moneys and adjust the accounts growing out of the employment of the ship. He has no right, by virtue of his employment, to insure the ship, as the owners of the shares holding them separately, it is for each to elect for himself whether to bear his own risk or to protect his interest by insurance.

A ship's husband cannot, by virtue of his agency, in the absence of specific authority, purchase a cargo on the credit of the owners, or borrow money generally for the use of the ship; but he will have a lien upon the proceeds of the adventure for his advances and disbursements in the discharge of his proper duties. He may call on each owner for his proper share of expenses for outfit, repairs, and necessaries, and if he advances for any one his proportion thereof he may recover it of him.

A part owner who has acted as ship's husband cannot retain, on account of his advances, the share of freight money belonging to other part owners who have acquired their interest in the ship after the advances were made. The presumption is that each part owner of a ship is liable for supplies and repairs furnished for her and for the wages of the seamen employed for the common benefit. But it does not apply to one who has expressly dissented from the employment of the ship, run by the other owner, who alone is liable for the supplies furnished while she was so run, notwithstanding the person furnishing the supplies had no knowledge of the fact. It has been held that a promissory note given by the ship's husband for the amount of a debt incurred for the ship, although a receipt in full be given, will not, until paid, discharge the debt nor extinguish the claim against all the owners.

In case of the absence of a part owner of the ship, it is held that each of the co-owners has an implied right to provide for her employment, and to make contracts and order supplies with that view; but a part owner, although the ship's husband, has no right to insure on account of the other owners. He may insure his own share, and, if ordered to do so, may insure for the others, but without some special understanding to the contrary each owner is expected to provide for insurance as he may elect to take such risks or a part of them himself.

When one or more part owners desire to employ the ship upon some particular voyage against the wishes of others, who prefer that she shall remain unemployed, those who desire the employment may, on applying to a court of admiralty, obtain permission. The court in such cases requires of them a stipulation to bring the ship back and restore her, or pay the dissenting owners the value of their interest in her. If a majority in interest wish to employ her, the minority, on applying to a court of admiralty, can compel them to give the stipulation. If they do not apply, they will be held to consent to the employment by the majority as upon joint account, and become liable for the expenses to the extent of their shares, and be entitled to their share of the profits of the voyage. But when a part owner of a ship dissents from her employment by the

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other owners, he is not personally responsible for supplies ordered by the latter, and this has been held to be the case when the person furnishing them had no knowledge of his dissent.

Where a part of the owners employ the ship, while the remaining owners decline to unite in the employment, those employing her and stipulating bear all the expenses of outfits and risks, and are entitled to all the profits of the voyage; for, as the owners refusing to unite are protected by the stipulation from loss, they are regarded as not entitled to anything for freight earned by the ship or her decline in value by wear and tear. According to the maritime law of the Continent of Europe, if the owners of a ship disagree among themselves as to her employment, a court of admiralty will, upon an application of the parties, decree a sale of the ship for the benefit of all the owners. A similar rule has been followed in the courts of admiralty in the United States. A court will not compel one owner to buy out another's interest, but may sell the whole ship and divide the interests of the different owners.

Where one in the possession of a ship as part owner, mortgagee, or charterer has the exclusive control and management of her, and employs her for his own benefit and at his own risk and expense, he is regarded, while such possession continues, as the owner; and the other owners are not liable for the expenses of supplies, whether the party furnishing them has notice of the relations between the parties or not. But if he sails the vessel on shares, the other owners are responsible; and they are responsible if, by the terms of a charter-party, they appoint the master and mariners and retain control of the ship. Under laws authorizing an attachment against a ship for supplies furnished, one part owner cannot attach her, and should he and the other owners give their bond according to the provisions of the law for her release, no recovery can be had upon the bond. A mortgagee of a ship not in possession of her is not liable for repairs to her, unless made at his request or by a special contract with him. But when he takes possession, he becomes liable as owner for her supplies and repairs subsequently furnished; and although the credit for them was given to the ship and owners, the person furnishing them may resort to him. In case of an injury to a ship occasioned by the wrong or negligence of a third party, all the owners are obliged to join in bringing an action against him. They are said for such a purpose to constitute but one owner, and whenever they recover damages for such a wrong they are to be divided between them according to their interest. The rule is the same in an action for the freight on goods conveyed in a general ship. Under the title "Lien" it may be stated that by a statute of New York and some other States a lien is given upon a ship for repairs, outfit, wharfage, piloting, &c.

AVERAGE BOND.

The Association of Average Adjusters of the United States have prescribed a new form of average bond. The forms heretofore in use have varied materially in their terms, and it was an object to obtain a general form which would apply in all cases, or nearly all. The old forms contained statements which were often not in accordance with the facts, as that the vessel was in charge of a pilot, or was in due prosecution of her voyage, when the facts might have been otherwise. The validity of a bond might thus be affected on suit in court.

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The new form is as follows:

AVERAGE BOND

Whereas it being represented that the ——, whereof —— —— is or lately was master, having on board a cargo of ——, in which we are interested as owners, shippers, or consignees, —— sailed from —— on or about the —— day of ——, 18—, bound for ——, and in the course of her said voyage ——, and that thereby certain losses and expenses were incurred, and other and further losses and expenses consequent thereto may yet be incurred, and that such losses and expenses may be a charge, by way of general average or otherwise, upon the vessel, her freight and cargo, or either of them:

Now, therefore, we, the subscribers, owners, shippers, or consignees of such of the cargo of said vessels as we have severally described and set opposite our respective signatures hereto, in consideration of the premises and of the delivery to us respectively of such cargo, or so much thereof as may be saved, without retention pending an adjustment of said losses and expenses, do hereby, for ourselves, our respective executors and administrators, severally and respectively, but not jointly, nor the one for the other, covenant and agree to and with ——, owners or agents of the owners of the said vessel, and with one another, that the losses and expenses aforesaid, or so much thereof as, upon an adjustment of the same, to be stated by ——, according to the laws and usages of this port in similar cases, may be shown to be a charge upon the said cargo, or upon any of the cargo, of said vessel which may be received by us, shall be paid by us respectively, according to our several and respective parts or shares thereof, unto the said ——, when such adjustment is completed and due notice given thereof.

Provided, however, that if any of said cargo has been shipped under bills of lading containing an agreement that the York-Antwerp rules shall be the rules of adjustment, such agreement shall not be affected hereby, but in all other respects this bond shall remain in full force.

And we further promise and agree to furnish said adjusters, upon their request, all information which they may deem necessary to a correct adjustment of this case.

This bond may be executed in several parts of like tenor and date, the whole of which are to constitute but one bond, with the same effect as if each of said parts were severally signed by us.

In witness whereof we have to these presents respectively set our hands, in the city of ——, this —— day of ——. one thousand eight hundred and ——.

Signatures.	Description of merchandise.	Invoice value.

MANIFESTS OF STORES.

Some years ago the Treasury Department decided that "it matters not whether portions of the cargo laden on a foreign vessel are in fact exported out of the country or are consumed on board;" that in either case, "if consumed by foreign vessels, they are really exports;" and that supplies cannot be taken for consumption on board a foreign vessel in the United States without being entered on her manifest.

In view of these regulations, the following questions were presented to this office, viz:

(1) Whether sea-stores, not only coal for fuel, but other ship supplies, for use on board a foreign vessel, bound on a voyage to a foreign country, should or should not be considered a part of her cargo within the spirit and intent of section 4197, Revised Statutes?

(2) If coal and other supplies laden on a foreign vessel are considered as a part of her cargo within the meaning of section 4197, Revised Statutes, would not coal and other supplies laden on a United States merchant vessel in like manner be considered a part of her cargo?

(3) Should not the masters of all vessels, both American and foreign, clearing from United States ports for foreign countries, file manifests of all ship supplies taken on board for consumption on the voyage?

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On examination the Bureau was convinced that the questions should be answered in the negative.

The law relates to the reporting on exportation of the "cargo" of vessels. In maritime law the word means the lading or freight of a ship, "the entire load." It is usually construed as including the goods, wares, and merchandise to be conveyed on a ship to another place, and not the stores of a vessel, her equipments, or the articles carried for the daily use of the officers and crew. The oath required by section 4198, Revised Statutes, as to such exportations mentions only "goods, wares, and merchandise" laden on the vessel. Supplies and stores for consumption are hardly included in that category. A discrimination is made between sea stores and cargo, in section 2794 Revised Statutes. This section provides that the master, owner, shipper, or consignee of a cargo shall state upon oath to the collector the foreign port or country in which such cargo is truly intended to be landed. Stores and supplies are not intended to be landed at a foreign port, and are often used in part within the jurisdiction of the United States, or while the vessel is proceeding coastwise. It would be a hardship upon the master to require a report of trifling purchases of supplies or stores, and a troublesome regulation to that effect might have a tendency to restrict purchases in the United States; clearances also would be delayed, and a vessel might incur a penalty, in some instances, as on a trip to Cuba, for not producing at the foreign port goods manifested in the United States. The Bureau therefore recommended in substance that the regulations upon the subject be rescinded. This suggestion was adopted by the Department, which has directed that manifests of ship's stores and supplies purchased in the United States in good faith for use on the outward voyage shall not be required by the customs officers.

AN OCEAN MILITIA.

The right to make war by means of vessels fitted out by private parties, or "privateering," as it is called, is a privilege very properly claimed by a republic like ours, which supports no large floating armament in time of peace. But of late years it has become the practice to enlist the support of private enterprise in time of peace, by having vessels built under the quasi recognition of Government, and though ostensibly for the purposes of commerce in carrying the mails or freight and passengers, to be in actual readiness for conversion with small expense into formidable cruisers, or fast-running transports for national service. Merchant steamships that can be readily converted into men-of-war are becoming a necessity with modern nations as a bulwark to ward off threatened collisions with foreign powers, as well as a reliance in case of actual hostilities. Countries having fast steam vessels of considerable size in their mercantile navy have them built under certain specifications, with a view to forming a kind of ocean militia, which, like a land militia, might be quickly called into service in case of need.

Some of the great maritime nations of Europe have now a large amount of tonnage constructed with a view of being almost immediately appropriated for naval purposes.

It was remarked by Washington in his message to the Third Congress that the rank due the United States among the nations should not be lost by the reputation of weakness.

[1] If we desire to avoid insult we must be able to repel it; if we desire to secure peace as one of the most powerful instruments of our prosperity it must be known at all times that we are ready for war.

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It is probable that our future wars, if we should be unfortunately drawn into any, must be with maritime powers, and will have to be conducted principally upon the ocean, and the value of a fleet of swift steamers in readiness for the emergency would be great as a mere intimidation.

The cost to the United States of building a navy to cope with the navies of first-class powers would be very heavy and its maintenance equally so. To obviate in a measure this great outlay, and make good in some degree the serious consequences to the country that might follow the absence of a navy and the inability to suddenly create one, a plan of this kind is thought by naval officers to be practicable as well as economical.

It was the opinion of Admiral Porter, given before a Congressional committee, that with a few such ships converted into war vessels at the breaking out of the late war, such a blockade of the Southern coast could have been established as would have prevented all communication, and the rebellion would have been strangled for want of supplies and the munitions of war necessary for carrying on hostilities.

The scheme referred to has recently been widely discussed, and has received serious consideration in naval circles, and a board of officers has been detailed to tabulate a list of such vessels as come within the required conditions.

After examination of the mercantile list, I can find only about sixty steam vessels that would probably be found available for such a purpose. These ships should be of iron and built in the United States. The limit as to size is 2,000 tons measurement, and as to speed, an average of 14 knots. In the appended list I have excluded all vessels over ten years old.

Steam iron vessels of the United States of over 2,000 tons measurement, and not exceeding ten years old.

Official number.	Name of vessel.	Tonnage.		Dimensions, in feet and tenths.				Where built.	Home port.
		Gross.	Net.	Length.	Breadth.	Depth.	When built.		
106145	Advance	2,604.57	1,919.42	295.0	38.4	23.4	1883	Chester, Pa	New York, N. Y.
106184	Alameda	3,158.23	1,939.10	314.0	41.0	17.3	1883	Philadelphia, Pa	San Francisco, Cal.
106198	Alamo	2,942.85	2,236.54	329.0	40.5	21.5	1883	Chester, Pa	Brooklyn, N. Y.
105595	Algiers	2,287.34	1,305.48	281.6	38.1	20.2	1876	Wilmington, Del.	New Orleans, La.
106019	Alleghany	2,014.42	1,433.08	250.0	38.5	16.6	1881	Philadelphia, Pa	Baltimore, Md.
3175	Berkshire	2,014.42	1,433.08	250.0	38.5	16.6	1881	do	Do.
125768	Chalmette	2,982.96	1,931.03	321.2	42.2	21.3	1879	do	New Orleans, La.
126269	Chatham	2,728.58	1,909.26	265.4	40.0	15.6	1885	do	Baltimore, Md.
126076	Chattahoochee	2,676.35	1,887.56	280.0	40.7	15.8	1882	Chester, Pa	Savannah, Ga.
	Cherokee	2,500.00		290.0			1886	Cramp & Sons	
126131	Cienfuegos	2,332.00	1,630.32	292.0	39.8	22.3	1883	Chester, Pa	New York, N. Y.
125760	City of Alexandria	2,480.32	1,701.53	307.0	38.5	16.6	1879	do	Do.
125868	City of Augusta	2,869.64	1,929.28	302.0	40.0	17.0	1880	do	Savannah, Ga.
125621	City of Macon	2,092.80	1,447.09	257.3	38.7	16.0	1877	Philadelphia, Pa	Do.
125664	City of Para	3,532.25	2,504.88	345.0	38.6	19.9	1878	Chester, Pa	New York, N. Y.
125979	City of Pueblo	2,590.16	1,712.96	320.6	38.6	16.6	1882	Philadelphia, Pa.	Do.
110346	City of Rio de Janeiro	3,548.30	2,275.45	345.0	38.6	19.9	1878	Chester, Pa	Do.
125629	City of Savannah	2,029.40	1,358.89	254.0	38.7	15.7	1877	do	Savannah, Ga.
125625	City of Washington	2,618.27	1,649.90	300.5	38.4	19.2	1877	do	New York, N. Y.
125941	City of Worcester	2,489.85	1,921.83	328.0	46.0	14.5	1881	Wilmington, Del.	Norwich, Conn.
125734	Colorado	2,764.84	2,022.36	306.0	39.6	21.6	1879	Chester, Pa	Brooklyn, N. Y.
125801	Columbia	2,721.89	1,746.14	309.4	38.5	23.3	1880	do	Portland, Oreg.
126316	Comal	2,934.53	2,251.16	320.0	42.8	21.5	1885	do	New York, N. Y.
6990	Decatur H. Miller	2,296.14	1,673.74	257.0	38.0	16.0	1879	Wilmington, Del.	Baltimore, Md.
135814	Eldorado	3,531.32	2,561.68	331.8	42.6	22.6	1884	Philadelphia, Pa.	New York, N. Y.

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Steam iron vessels of the United States of over 2,000 tons measurement, &c.—Continued.

Official number.	Name of vessel.	Tonnage.		Dimensions, in feet and tenths.				Where built.	Home port.
		Gross.	Net.	Length.	Breadth.	Depth.	When built.		
135800	El Paso	3,531.32	2,561.68	331.8	42.6	22.6	1884	Philadelphia, Pa.	New York, N. Y.
135791	Eureka	3,531.32	2,561.68	331.8	42.6	22.6	1884	... do	Do.
135626	Excelsior	3,263.95	2,406.77	340.0	44.0	23.5	1882	Wilmington, Del.	New Orleans, La.
120531	Finance	2,603.03	1,919.78	295.0	38.0	23.0	1882	Chester, Pa.	New York, N. Y.
85715	Guyandotte	2,350.57	1,651.31	267.0	40.5	16.4	1882	... do	Do.
95803	H F. Dimock	2,625.93	1,786.37	271.8	41.6	19.2	18-3	Philadelphia, Pa	Boston, Mass.
140640	Lampasas	2,942.85	2,236.54	329.0	45.5	21.5	1883	Chester, Pa.	Brooklyn, N. Y.
140890	Louisiana	2,840.33	1,805.84	320.0	39.0	14.9	1880	... do	New York, N. Y.
91554	Mariposa	3,158.33	1,939.10	314.0	41.0	17.3	1883	Philadelphia, Pa.	San Francisco, Cal.
90884	Morgan City	2,270.97	1,200.66	281.0	38.1	20.1	1876	Wilmington, Del.	New Orleans, La.
130249	Nacoochee	2,680.00	1,905.24	280.0	40.7	15.8	1882	Chester, Pa.	Savannah, Ga.
130179	Newport	2,735.24	1,806.24	326.0	38.2	23.9	1880	do	New York, N. Y.
130098	Niagara	2,265.28	1,667.60	275.0	38.0	23.2	1877	... do	Do.
155048	Onoko	2,164.42	1,933.20	287.3	38.8	20.7	1882	Cleveland, Ohio	Cleveland, Ohio.
19485	Oregon	2,335.38	1,642.28	283.0	37.4	23.4	1878	Chester, Pa	Portland, Oreg.
150344	Philadelphia	2,098.52	1,492.72	264.0	35.0	20.6	1885	Philadelphia, Pa.	Philadelphia, Pa.
150280	Pilgrim	3,483.66	2,512.90	372.0	50.0	15.6	1882	Chester, Pa.	Fall River, Mass.
20587	Queen of the Pacific	2,727.80	1,672.15	331.2	38.5	21.2	1882	Philadelphia, Pa	San Francisco, Cal.
110515	Roanoke	2,354.38	1,654.53	267.0	40.5	16.4	1882	Chester, Pa.	New York, N. Y.
115873	San Blas	2,075.00	1,496.50	283.0	37.0	21.0	1882	... do	Do.
115845	San José	2,080.72	1,538.28	283.0	37.0	21.0	1882	... do	Do.
115863	San Juan	2,076.14	1,496.46	283.0	37.0	21.0	1882	... do	Do.
115818	San Marcos	2,839.29	2,187.66	317.8	39.5	21.4	1882	... do	Brooklyn, N. Y.
115978	San Pablo	3,119.02	2,112.64	331.3	42.2	19.5	1884	... do	New York, N. Y.
115894	San Pedro	3,119.02	2,112.64	331.3	42.2	19.5	1882	Philadelphia, Pa.	Do.
115979	Santa Rosa	2,416.78	1,335.60	326.5	40.9	20.7	1884	Chester, Pa.	San Francisco, Cal.
115662	Santiago	2,358.78	1,695.64	269.0	39.1	22.4	1879	... do	New York, N. Y.
115630	Saratoga	2,426.13	1,692.05	298.0	38.6	23.5	1878	... do	Do.
116029	Seneca	2,729.42	1,911.01	271.5	40.0	16.4	1884	... do	Do.
115645	State of California	2,266.03	1,260.06	300.0	38.6	24.4	1879	Philadelphia, Pa.	San Francisco, Cal.
145320	Tallahassee	2,677.41	1,890.00	280.0	40.7	15.8	1882	Chester, Pa.	Savannah, Ga.
145405	Tioga	2,085.16	1,744.24	285.0	38.9	14.0	1885	Buffalo, N. Y.	Buffalo, N. Y.
25242	Umatilla	2,131.49	1,335.62	310.0	40.6	22.3	1881	Chester, Pa.	Portland, Oreg.
80839	Walla Walla	2,134.80	1,239.09	310.0	40.0	24.3	1881	... do	Do.
80808	Willamette	2,502.24	1,695.36	315.6	39.2	21.8	1881	... do	Do.

PROPOSED ISTHMIAN CANALS.

THE DE LESSEPS CANAL AT PANAMA.

As connected with navigation the subject of a water-way or passage for ships over the isthmus separating North and South America possesses great interest. Such a passage would cause many changes in shipping and commerce, and would considerably affect the transportation business in the United States by transferring freight to other channels, and might occasion the use of a different class of vessels from that now employed. Great engineering works of this character alter the channels of trade and tend to revolutionize commerce, as shown by the history of the Suez Canal.

There are three projects now in contemplation for effecting a passage across the Isthmus, each of which has arguments and ardent supporters in its favor.

Work on the route by the Isthmus of Darien, proposed by M. De Lesseps, is in actual progress.

It appears that to January 1, 1886, there had been excavated a total of 14,078,856 cubic meters of earth out of 105,921,144 estimated to be excavated. The canal is to be about 46½ miles in length. The flow of the canal is to be through the valley of the Chagres, of the same width at the bottom as the Suez Canal, viz, 72 feet. In the section be-

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tween San Pablo and Padre Miguel it is to have 78 feet at bottom and 102 feet at water-level; at Culebra, in the Cordilleras, the width at the bottom will be 72 feet, and 100 feet at water-level. The depth of navigable water in the canal is to be from 28 to 29 feet, and the curves are to have a radius of not less than 8,000 feet.

The plan involves also the construction of a basin 1,600 yards long and 110 yards wide at Panama, for the accommodation not only of vessels passing through the canal, but for those which are loading and unloading there, and another large basin or siding about 3 miles long at Tavernilla, a point about half way between Panama and Colon, for a turn-out, or a place for ships to cross each other in transit.

For 10 miles from Colon the land reaches gradually an elevation of 20 feet, thence for 14 miles the elevation is from 40 to 170 feet. At Culebra, the highest point on the line, the elevation is stated to be 322 feet above the bottom of the canal, this height being maintained for a few hundred yards. The canal will have to be dredged about 4 miles into the Bay of Panama.

Fifteen thousand men were stated to be employed on the canal January 31, 1886, the company having 21 dredges and 82 excavators at various points on the work, with the requisite auxiliary boats, trains, and machinery.

It is stated that the chief difficulty in perfecting the work will be to control the waters of the Chagres River, which, in the rainy season, if unrestrained, are liable to flood a large portion of the canal. The other difficulties will be the great amount of excavation necessary; keeping the section of the canal in the Panama Bay from being filled in by the ocean and the Rio Grande; and securing the labor required at practical rates. It is proposed to turn the Chagres River by the erection of a dam about three-quarters of a mile long, 140 feet high, and 1,300 feet wide at the base, in a place between two hills naturally favorable to the work. Estimates have been made that 9,000,000 cubic yards of earth and stone will be required for the dam, of which materials the cuttings in the neighborhood will furnish an abundance. The question as to the practicabiltity of the construction of the dam is only as to its cost; the same remark applies to the other difficulties mentioned. It has been suggested that the employment of Chinese may greatly facilitate the enterprise, and that powerful dredges, now shortly to be in use, will lessen the labor and cost of the excavations. The minimum of wages paid is $1.75 per day, white mechanics receiving $5 per day in gold.

The receipts of the company are stated to have been $109,260,000. Much of the expense, say two-thirds, has been in the form of plant, saving expense in the future. A new loan of $120,000,000 has been authorized, and there seems to be reason for supposing that the class of small original subscribers in France may absorb the loan. The ultimate cost of the work as proposed cannot well be estimated with certainty. Hon. John Bigelow, who visited the canal and reported thereon as a delegate for the Chamber of Commerce of New York, and from whose report many of the facts herein stated are taken, states that he knows of no person who is competent to say that the canal cannot be built for the aggregate of the two sums mentioned. The question of remuneration to the stockholders is one concerning which it would be difficult to form an opinion.

The tonnage that would have passed the Isthmus in 1866 was estimated by Admiral Davis, of the United States Navy, to be 3,094,070 tons. At $3 per ton this would give an income of $9,000,000 per annum.

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Other estimates have been made ranging from 3,000,000 to 10,000,000 tons per annum.

The opinion is expressed that should the company abandon the canal the contractors themselves would probably find it for their interest to combine and finish it.

There is a possibility that the canal will be built, but the date of its completion is uncertain. The other two projects are in a less forward condition.

The advantages and disadvantages of the route are set forth substantially as follows in a publication by the Navy Department:

(1) That it is the shortest of the practicable routes.

(2) That it will cost less than any other canal offering the same advantages.

(3) That it can be constructed in less time than any other canal.

(4) That the cost of maintenance will be less.

(5) That it will be more easily preserved from obstructions.

(6) That it has ports at its termini.

(7) That it runs through an inhabited district.

(8) That there is already a railroad along the entire route of the canal.

(9) That a sea-level canal is the only kind that will satisfy the demands of commerce.

To these claims it is objected—

(1) That it is not the shortest of the practicable routes. A sea-level canal across San Blas would be at least 15 miles shorter.

(2) It will cost more to construct a sea-level canal than one with a few locks, and the advantages claimed for it of having only a tide-lock amount to nothing, as that one lock limits as effectually, and in the same degree, the number of ships that could pass through the canal as would five or six locks, or even more.

(3) Some able engineers doubt the possibility of its construction without unlimited funds and time. The natural difficulties to be overcome are of the most gigantic proportions. The grand difficulty is to provide for the surface drainage. The average rainfall amounts to over 12 feet. This is not distributed throughout the year, but is precipitated within two periods, or rainy seasons, aggregating at most seven months. During a single rain-storm 6¾ inches have fallen in six hours. The floods in consequence are excessive, and in the Chagres River often rise 30 or 40 feet in a few hours. As the canal is to be at the sea-level, it would be the ultimate drain of all the waters in the basins of the Chagres and the Rio Grande. At the point where the canal crosses the Chagres River it is, in the dry season, a small stream about 250 feet wide and 2 feet deep, but during a heavy flood the width becomes 1,500 feet, the depth over 40 feet, and the volume of water passing this point is fully 160,000 cubic feet per second. The bed of the river is here 42 feet above the sea-level, which is to be the level of the canal. The top of a 40-foot flood would then be 82 feet above the level of the canal where it crosses the Chagres, or, making allowance for the decrease due to the velocity of the water as it approaches the precipice and for the head of water above the ocean level after falling, 78 feet.

This immense volume of water would fall through this height into the canal, unless the river is diverted from seeking its present bed. The flood waters of the Chagres are not only heavily charged with detritus, but with an immense amount of *débris* as well. Houses, trees, masses of vegetation, rocks and stones are borne on its floods, and in a freshet which occurred in the winter of 1879–'80 an iron tank 17 feet above the level

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of the railroad track was carried away. In order to divert these floods from the canal, it is proposed to build a dam across the river at a point above where the canal crosses the Chagres, and then lead the waters from above the dam by an entirely new channel to the sea. This undertaking is almost equal to the rest of the work. The dimensions of the proposed dam are, height 132 feet, and length 5,248 feet, or nearly a mile. As yet no foundation has been found upon which to rest such a dam. It is estimated that the basin resulting from the construction of the dam will hold 1,300,000,000 cubic yards of water, a volume equal to that of the greatest flood that has been recorded. It is not, however, as much as two floods would bring down, and in the contingency of two floods occurring within a short interval, the basin would overflow into the canal and cause its destruction. To emphasize the necessity of providing for surface draining, and prevent its being taken into a canal, Admiral Ammen quotes the following, in a paper before the American Geographical Society, from the Bulletin Décadaire of the Suez Canal of June 12, 1878:

On the part of the canal in the vicinity of the Suez, on the 25th of October last, a violent storm produced a sudden and immense temporary torrent, which, precipitating itself from the mountain of Attaka, fell into the canal, carrying with it a very large mass of solid material. This deposit, thanks to the activity of our employés, was dredged very rapidly, so that navigation was not retarded a single day; but this unexpected dredging has added 30,000 francs to the expenses of the canal.

With reference to this Admiral Ammen states:

The mean annual rainfall at Cairo, less than 100 miles from this locality, is 1.3 inches. At Aspinwall the mean annual rainfall is 124.25 inches. During the month of November, 1870, there was a rainfall of 32.5 inches, twenty-five times the mean annual rainfall at Cairo. If the rainfall, as at Aspinwall, were the normal condition along the line of the Suez Canal, it seems altogether probable, from the damage and expenses caused by one shower, as quoted above, it would be a matter for serious consideration whether it would not be economy to look up sufficiently high at least to avoid the effects of surface drainage.

(4) Its cost of maintenance must necessarily be very great on account of controlling such an extensive system of artificial drainage under the most unfavorable circumstances.

(5) The harbor on the Atlantic side, in its present state, is exposed to the severe northers which blow occasionally during the winter months, but suitable protection may be afforded by the construction of a breakwater.

(6) The cost of excavation will be much increased on account of the distance materials will have to be lifted out of the cut, and on account of the distance they will have to be carried before a final deposit. The eminent American engineer, Mr. Trautwine, estimates that when excavation costs 19 cents a cubic yard when deposited within 25 feet, it will, if carried 1 mile in carts, cost 57.09 cents per cubic yard, and if carried 2 miles will cost 95.57 cents per cubic yard.

This rapid increase in the ratio of cost shows how important it is to have a place of deposit close at hand. In ordinary works much of the excavated material can be used to make fills or embankments in its immediate vicinity, but in case of a sea-level canal it must be placed where it will not be washed back again, and this will involve its transportation over long distances.

Every cubic meter of earth taken from the summit must be hauled away to some distant point for deposit, since there is none in or about the narrow pass, and if there were such a place the torrents of the rainy season would sweep the material back into the cut. Soon after leaving the coast, upon either side the mass of cutting falls much below the country level, and the earth or rock must be lifted to that level, to be then hauled a distance, or it must be taken along the line of excavation to the sea. This

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evil of long carriage grows greater as the cuts from either side penetrate the elevated regions and precisely where the vast mass of excavation is to be done. As the cut reaches the rock formation it will lie below an extended drainage area hundreds of feet above. Must it not be anticipated that subterranean water channels will be cut, channels carrying water coming from the heights above, and therefore under heavy pressure? * * * Under the conditions thus briefly sketched, and remembering that a cubic meter is more than one and a quarter cubic yards, can there be any doubt of the expensive character of the work? Will any experienced man believe that any 27,000,000 cubic meters of excavation can be taken out and hauled to a distant dump at the rate of 37 cents per cubic yard? Can he believe that hard rock can be excavated, raised to the surface, and hauled away for $1.76 per cubic yard, or that it can be excavated below the sea-level, pumping included, and carried off for $2.65 per cubic yard?

(7) It is true that the line passes through what may be called an inhabited country, but the resources of the country and its inhabitants are of but little value in this case. The climatic conditions are as bad as can be found on any portion of the Isthmus. All provisions required for the sustenance of the construction party have to be imported, as also the materials for constructing the work, as suitable materials for hydraulic works are not to be found in the country. The railroad ties and telegraph poles of the existing road are imported. In stating the probable cost of a canal through Nicaragua, the United States Canal Commission rejected the 25 per cent. usually allowed by engineers to cover contingencies, as insufficient, and applied 100 per cent. instead. Treating the estimated cost of the Panama sea-level canal in this manner, the probable cost will amount to $306,400,000. However, as the work on this canal is already advanced, it enjoys an advantage over other routes which are only projected.

LOCK CANALS BY WAY OF LAKE NICARAGUA.

A lock canal is proposed for the Nicaragua route, having Lake Nicaragua for its summit level. The river navigation is to be secured by means of a dam placed across the San Juan, where an excellent site is said to exist. This dam will be 2,000 feet long, 49 feet in height above the surface of the river, or 59 feet above the river-bed, and it will raise the surface of the lake 3 feet, making the summit level 110.63 feet. Slackwater navigation is thus secured in the San Juan for about 63 miles. This summit level will be 130 miles long, of which distance less than 10 miles are canal, leaving over 120 miles that can be traversed at a high rate of speed. To ascend to the summit level from the Pacific one tide-lock and six lift-locks will be used. Five locks will be required on the Atlantic slope. Fifty-three and seventeen one-hundreths miles of the route will be by actual canal, and the residue of the total length of 173.57 miles will be by river and lake navigation.

Some of the objections against this route are stated to be (1) its length, (2) that it requires locks, (3) its want of harbors, (4) that it lies in a volcanic region.

These objections have been answered as follows:

(1) The length of the canal proper is only 8 miles greater than that required on the Panama route. If two canals differed in their conditions only in the element of length, the shorter would, of course, be preferred, but if they differ in other respects, it is possible that the longer canal would have the preference. This is actually the case between Panama and Nicaragua, although a vessel would be a longer time in transit from ocean to ocean via Nicaragua than via Panama, yet she would, if a sailing vessel, make the voyage from New York to San Francisco and back in nineteen days' less time than if required to go via Panama, and, if a steamer, in five days' less time.

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(2) That it requires locks. If an artificial strait could be cut through the Isthmus at any point and maintained, it would be desirable, but any sea-level canal through the Isthmus must be provided with at least a tide-lock, and this, as already shown, limits the capacity of the canal to receive or discharge vessels as effectually as if other locks intervened. Locks are objected to as expensive to maintain, as liable to be damaged and interrupt the traffic of the canal, and on account of the length of time required to pass vessels through them.

(3) The next objection to be answered is the want of harbors. The plans proposed for the restoration of Greytown Harbor and the protection of the Pacific terminus of the canal at Brito have been before the most eminent engineers of the world, and it is said that all who have studied them regard the means proposed as capable of accomplishing the end in view.

(4) The remaining objection, that the route lies in a volcanic region, seems to be very well disposed of by Mr. Menocal in a discussion of this point before the American Geographical Society.

The references not only show that the locks and dams of the canal will not be affected by earthquakes, but that the country furnishes building material of a superior quality.

The advantages which the route possesses are stated as follows:

(1) It is in a favorable geographical position, being in the region of the trade winds, and is especially favorable to the United States.

(2) A canal constructed here will cost less than half as much as by any other route.

(3) It passes through a country rich in resources and already sufficiently developed to subsist the construction force.

The country in the vicinity of the lake cannot be surpassed in the beauty of its scenery. The soil is productive, and its pastures abound in excellent cattle. On the west side of the lake the country is thickly populated, and coffee, sugar-cane, indigo, cocoa, corn, rice, and all the tropical fruits are successfully and extensively raised.

Valuable woods, both for constructions and cabinet work, as well as other materials for constructions, are abundantly found on the mainland as well as on the several large islands in the lake.

The population is between 250,000 and 300,000, of which number the majority are located in the vicinity of the lake and between it and the Pacific. There is an abundance of good stone, but it is not suitable for dimension stone. It will answer very well for concrete. There is plenty of limestone, and the kilns now in operation produce an excellent quality of lime suitable for hydraulic works. Bamboo, which would be useful in the works connected with the restoration of Greytown Harbor, can also be obtained in the country.

(4) It offers no engineering difficulties that are not easy of solution at a moderate expense. The difficulties to be encountered are such as are met with and overcome in all engineering works of this kind.

(5) It is a fresh-water canal, and will perform an important office in cleaning the bottoms and boilers of vessels passing through.

(6) It offers splendid facilities for dockage and repairs on Lake Nicaragua; and it is not improbable that Patterson's grand scheme of establishing a distributing center for the commerce of the world may find its realization on the shores of Lake Nigaragua.

(7) All the materials needed for construction of the canal are close at hand.

(8) All plant can be conveyed by water communication already established, and for which no royalty is to be paid. Between the lake and the Pacific several passable roads exist, and whatever other roads

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might be required over this short distance can be readily made at inconsiderable cost.

(9) The mean annual rainfall is comparatively small. The lower part of the San Juan Valley has a rainfall of 85 inches or more per annum; above the mouth of the San Carlos 80 inches, and at Virgin Bay, Lake Nicaragua, the rainfall does not probably exceed 50 inches.

There is a distinct dry season of between five and six months, when work in progress would not be delayed or injured, and but little interruption need be apprehended in the rainy season on that portion lying between the lake and the Pacific, as the rains generally fall at night, with occasional showers during the day.

(10) The important physical feature of the route is the existence of Lake Nicaragua. It is capable of supplying twenty times the volume of water which the commerce of the world would require in the lockage of vessels.

(11) It can be easily demonstrated that it will be a paying investment even at twice the estimated cost, and that without charging more than $2 per ton toll a yearly interest of at least 8 per cent. can be paid on $100,000,000.

THE EADS SHIP-RAILWAY, TEHUANTEPEC, MEXICO.

It is proposed to build a ship-railway across the Isthmus of Tehuantepec, in Mexico; and, in order to accomplish the object, to organize a stock company and issue stock and bonds, not to exceed in the aggregate $100,000,000.

The Committee on Commerce of the United States Senate reported favorably, May 28, 1886, a bill to incorporate the Atlantic-Pacific Railroad Company, and state that the route is practicable, that there is no swamp land encountered upon the line, and that the harbors are of a character suitable to meet the wants of the commerce of the world. The bill recommended provides for the incorporation of a company, and for a guarantee by the United States that if, after the completion of the road, two-thirds of its net revenue shall not, during the period of five years, annually amount to $3,500,000, the Government will make good the deficiency, provided that in no event shall the aggregate liability of the Government exceed the sum of $7,500,000. The Government is not asked to advance any money to aid in the construction of the road.

The test of the capacity of the road is to be the weight of a ship and cargo of 6,000 tons, and after a year the road is to be capable of carrying a ship and cargo weighing 7,000 tons.

It is stated that Mexico has guaranteed one-third of the net revenue of the road.

The advantages claimed over the canal are, that the road can be constructed and operated with greater economy; that it can be constructed in less time; that it can transport vessels more rapidly and with greater safety, and that it can be more readily enlarged to meet the future wants of commerce. The construction of the ship-railway will decrease the distance to be sailed over by ships from New York to San Francisco nearly 11,000 miles.

The climate of the Isthmus of Tehuantepec is stated to be generally salubrious, with the exception of the immediate valley of the Coatzacoalcos River, where malarial fevers are prevalent a portion of the year. The carriages are to have many wheels, running on six parallel rails; the ship is to rest upon numerous springs; and it is claimed, so far as the strain upon the rails is concerned, that a rail of ordinary dimensions

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would answer the purpose, though a special steel rail will be used, weighing about 120 pounds to the linear yard, resting upon long steel ties, to extend under the distance of the track, from 45 to 50 feet wide. The road will be about 134 miles long.

The Senate committee's report shows that many distinguished engineers, naval constructors, and ship-builders of the world concur in the opinion that the project of building the railway and conveying the largest ships thereon, with their cargoes, is practicable.

The following remarks upon the subject are contained in a report published by the Navy Department in 1883:

The Atlantic terminus of the railway is reached from the mouth of the Coatzacoalcos by using that river for 25 miles and then by means of a ship-canal through the swamps for 29 miles. Here a system of twelve rails is to be laid, extending 3,000 feet, into a dock of masonry, fitted with a gate or caisson, so that it can be pumped out when repairs need to be made. The grade of the bottom of the dock, and consequently of the railway, is 1 foot in 100 feet. From this initial point of the road the railway pursues a series of straight lines—all changes of direction, estimated to be three, being made by turn-tables—passes over the divide 732 feet above the level of the sea, and descends to the Pacific coast, 110 miles from its starting point. Here a dock similar to the one already mentioned, built in one of the lagoons, whose common entrance is the Boca Barra, forms the Pacific terminus of the railway. The maximum grade allowed is 2 feet in 100 feet, or 105.6 feet per mile. The cars for transporting the ships are to be built of a series of plate-iron cross-girders, extending across the whole width of the twelve rails, and running upon wheels, which are 2 feet in diameter, placed 3 feet apart. Each wheel is borne upon a separate and independent axle, so arranged that it can be easily removed and replaced in case of accident. Upon this car is a cradle, with keel and bilge-blocks and all other supports necessary for keeping a ship in an upright position. The car is to be 100 feet shorter than the vessel which it is intended to carry, so as to give an overhang of 50 feet at each end. The motive power is furnished for the submerged ends of the road by a stationary engine; over the remainder of the route two powerful locomotives, each resting on six rails, are to be used.

The method of operation proposed is that the stationary engine would back the car, with its cradle, down into the dock; the ship would then be floated over this cradle and the various supports put in place. When adjusted to its position the car and ship would be drawn up the incline by the stationary engine. The two locomotives would then be attached to the car, and take it across the mountains at the rate of at least 6 and possibly 12 miles an hour.

To provide for the passage of ships going in opposite directions and for repairs turnouts are to be conveniently placed, the change of direction from the main track to be accomplished by means of a turn-table.

The principal points to be considered with reference to the practicability of constructing and operating successfully an interoceanic ship-railway are stated as follows:

(1) Can a roadway be built in an isthmian country that will have the necessary solidity and permanency to maintain the system of rails of each section in the same plane and permit the transportation of great weights massed in a comparatively small area?

(2) Can a loaded vessel be taken from the water and be supported in a car without sustaining unequal and unprovided-for strains upon her hull; and, if such support can be given at rest, is it possible to overcome the inertia of the loaded car and maintain its motion over the road-bed without imparting concussive, torsional, transverse, and longitudinal strains, which would prove injurious, if not destructive, to the vessel?

(3) If it were possible to transport the largest vessels with their cargoes without damage of any kind to the vessel so transported, would the ship-railway offer any advantages to commerce that a ship-canal could not supply?

The advantages claimed by the projector for the route and scheme are:

(1) That it is the shortest route for the greaterpart of the tonnage that would use any canal.

(2) That the prevailing winds are much more favorable to commerce than they are by any other route.

(3) That it possesses superior advantages for the United States from a military point of view.

(4) That it is situated in a state which is not only averse to European domination, but has the power to resist invasion.

(5) That it is more healthful than any of the other routes.

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For the scheme it is claimed:

(1) That it is entirely practicable.

(2) That the cost would be one-half that of a canal having locks, or one-quarter of one without locks between the same points.

(3) That the railway can be built in one-third or one-quarter the time required for a canal.

(4) That, when built, ships of the maximum tonnage can be moved four or five times faster than by the canal.

(5) That a greater number of vessels per day can be transported than would be possible by the canal.

(6) That the capacity of the railway can be easily increased, without interrupting its business, to meet either an increase in commerce or an increase in the size of ships.

(7) That the cost of maintenance of the roadway and rolling-stock would be less than that of a canal.

(8) That the cost of operating the railway will be less than the cost of operating the canal.

(9) That the railway can be located and successfully operated in localities where it is not practicable to construct a canal.

(10) That it is possible to estimate with great accuracy the cost of a ship-railway and the time needed to build it.

In reply to these statements the advocates of a ship-canal assert as follows:

(1) It is not the shortest route for the greater part of the tonnage that would use a canal. Tables compiled by the Chief of the Bureau of Statistics, Treasury Department, contain data which show that it is the shortest route for only one-tenth of the tonnage that would have used a canal in 1879.

(2) The prevailing winds and currents are not favorable to vessels using this route. The following authorities are cited as substantiating this statement: Wind and Current Charts, United States Hydrographic Office; Meteorological Charts, Depot des Cartes et Plans, Paris, 1874; Current Charts, British Admiralty, 1872; M. F. Maury, Wind and Current Charts, North Atlantic.

(3) The advantages claimed for the Atlantic terminus, from a military point of view, are not true for its Pacific terminus, and even were they the United States could not easily take advantage of them. In fact, they make a blockade by any naval power especially easy.

(4) It is true that Mexico is averse to foreign domination, but this includes American as well as European states. She is not able to resist invasion, as was shown in her war with the United States and by the French occupation.

(5) The climate is healthful for a tropical country, but not more so than other portions of the elevated table-lands of the Isthmus. On this or any other route all the resources of sanitary science will be required to keep a working force in fair condition.

To the scheme it is objected:

(6) There is more than a reasonable doubt as to its practicability, as *all* the iron-ship builders in the United States, with one exception, and many of the ablest engineers have declared it impracticable. The difficulty of moving ships, completely empty, down an incline of 1 foot in 12 feet, and frequently more, is well known.

(7) As no such structure as the contemplated railway has ever been built, all statements as to its comparative cost with other structures are purely theoretical. Marine railways, launching ways, and the cost of construction of the bottoms of dry-docks furnish a poor but at the same time the only practicable means of comparison.

(8) The claim that the railway can be built in one-third or one-fourth the time required to build a canal is entirely theoretical, there being no data founded on facts from which to judge.

(9) It is not clear how masses weighing 20,000 tons (the weight of a ship, cargo, and transporting car), nearly half the weight of the Washington Monument before the last addition to it, can be carried at any speed approaching 6 miles an hour. In fact, it is difficult to conceive how the load can be started at all, as it represents a single rigid weight. Traction engines, whatever their power within practical limits, can never overcome the inertia of 20,000 tons, represented by a rigid car carrying a single rigid weight of 10,000 tons. Cars in a freight train are started progressively. The locomotive moves forward, bringing its momentum to bear upon the first car, which, starting, imparts a less momentum to the next car in order, and this does the same, in a lessened degree, for the next, and so on. Each successive start of the locomotive gives rise to a like series of impulses to the cars until finally the entire train is in motion, and the same thing proceeds until the proposed speed is attained. Were the train massed in weight upon a single car, the locomotive could produce no effect upon it. The difficulty is well illustrated at the Georgetown Canal incline. The weight with water in the pontoon is 400 tons, concentrated in a single car, the pontoon. The power is equal to 200 horses. The 400 tons is, in effect, on a horizontal road-bed, being balanced by equal weights, exerting all their gravity so as to aid in

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pulling the pontoon. If the car be arrested on the way, the machinery cannot overcome the friction of quiescence, and assistance of a powerful character becomes necessary.

Claims 6, 7, 8, and 9 are statements of what the projectors believe, not what they know. There are no known grounds upon which such claims can be based.

Referring to the claim that a greater number of vessels can be passed over the railroad in a day than by a canal, it is not apparent how, with a single set of tracks, and sidings which must necessarily be few, ships can be made to pass each other at a more rapid rate than in a canal whose basins can be located as nearly together as may be desired; this, too, without considering the liability to accident of the machinery operating the turn-tables.

(10) The estimates of cost and time for construction may be given from purely theoretical considerations and from the comparisons with the cost of ordinary railways.

These are some of the principal considerations and arguments urged for and against the projected Isthmian Ship Railway. It is no wonder that the projectors of the proposed ship-canals should bring all possible reasons against a rival scheme of such a character, which if successful would prove injurious, if not disastrous, to the more expensive canal routes. But in spite of the alleged objections to the plan as shown above, it appears to be considered feasible by the Committee of the United States Senate on commerce, which has sufficient faith in the enterprise to recommend the guarantee of a limited amount; and there is this in its favor, that if ever put into practical operation the ship-railway will offer to American shipping certain privileges not enjoyed by our competitors and be another achievement of American enterprise, as well as an additional plume in the cap of the American inventor. It would seem that our engineers and scientists have sufficient data from which to arrive at the possibilities in this case. Men who could turn the current of the Father of Waters, tunnel beneath and span our rivers, and whose goddess of Liberty is now lighting the mariner into our harbors, should be able to tell us whether a ship and cargo can be so moved and within an iota of the cost of moving them.

JUPITER SIGNAL STATION.

Among the measures pending before Congress for the protection of American ocean commerce the bill providing for a signal station at Jupiter Inlet, Florida, is commended.

Vessels proceeding northward from the Gulf of Mexico generally take advantage of the Gulf Stream, whether bound to our own Atlantic ports or to Europe, and pass in sight of Jupiter Inlet. Steamers bound to the Gulf of Mexico from the northward also generally sight the lighthouse at that point, from which it is customary for navigators to "take their departure." It is stated that more ocean commerce passes through the comparatively narrow channel of the Gulf Stream at that point than through any similar waters on our coast. Besides our heavy West India trade, it embraces a vast volume of coastwise traffic between Atlantic and Gulf ports, and most of the foreign shipments of cotton, sugar, lumber and other products of our southern border.

A signal station at Jupiter Inlet would serve to warn vessels of approaching storms, and would be especially adapted to the saving of life and valuable property from the dangers of the sea, at a point near where the tropical waters of the Gulf mingle with those of the Atlantic.

For many years merchants and underwriters interested in commerce with the Gulf of Mexico have urged the establishment of the station, which until recently involved the necessity of constructing a line of Government telegraph from Saint Augustine, at a cost of $30,000. The recent building of a railroad from Enterprise to Tampa Bay, however,

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has shortened materially the length of telegraph line required, which is now estimated to cost only $17,000. The telegraph line, of course, is requisite to enable the headquarters of the weather service at Washington to maintain constant communication with the station. It moreover will aid to protect property and life, by affording the means of sending prompt relief in cases of disaster.

The Signal Service have recommended the station as a valuable point for meteorological observations. The Life-Saving Service and the Light-House Board would doubtless also find its telegraph line a material aid in their operations in rescuing the shipwrecked and for the benefit of commerce. In case of war it would afford the Government a means of communicating with our fleet passing into or out of the Gulf and would convey to us the first intelligence of the approach of a hostile fleet passing that point.

The measure (Senate bill 2652) has been passed by the Senate and is pending in the House of Representatives, and has twice been reported favorably by the House Committee on Military Affairs; first, when introduced by General Egbert L. Viele, Representative from New York, and again when received from the Senate.

CAPE HATTERAS SHOALS.

It is not generally known that one of the most dangerous reefs on the Atlantic coast is still unmarked by a properly constructed beacon or light-house. I refer to the outer Diamond Shoal, lying about 7½ miles off Cape Hatteras. Undoubtedly there are many difficulties in the way of building a safe and firm structure upon a shifting sand-bank so far seaward from a salient point of the coast; but during the last session of Congress the shipping interest of the whole Atlantic coast and Gulf of Mexico memorialized Congress to authorize the Light-House Board to erect a proper light, with powerful fog-signal, there.

The importance of the project can hardly be overestimated, and difficult as may be the undertaking, it is thought that the appeal, where so much of life and property is at stake, should be regarded.

OCEAN LIGHT-SHIPS AND TELEGRAPH STATIONS.

The question of ocean-telegraph ships, to perform the triple purpose of light-houses, telegraphic semaphores, and relief stations, is now engaging considerable attention in Europe and in this country. The necessity of telegraph light-ships off our coast is becoming recognized with every season of storm and disaster. Scientists and navigators, in the interest of maritime powers, have become interested in the subject, and it is thought that the result to be attained by a system of such vessels moored in the frequented routes of steamships would repay the expense.

The knowledge derived from the surveys of the United States ships Tuscarora, Essex, and Blake, the English ships Challenger and Alert, and German ship Gazelle, together with the experience acquired in the use of the submarine telegraph, has demonstrated beyond much doubt the practicability of a system of mid-ocean telegraph stations.

The system proposed by certain scientists and inventors is designed chiefly for the collection and distribution of scientific observations from fixed stations, anchored along frequented ocean tracks, for the benefit of science, commerce, and agriculture, the succoring of wrecked or distressed vessels by reason of known location of these relief stations, and for reporting the movements and conditions of shipping at sea, allaying

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the anxieties of those interested when making lengthy voyages, obtaining orders, and enabling owners and merchants to save time and money in making better disposition of their cargoes, and providing ready communication between ships on a voyage and the mainland.

In the science of meteorology the United States Signal Service Bureau takes a high rank, and its contribution of weather reports are very valuable to agriculture, as well as navigation. Its efficiency and value are recognized by the weather bureaus of European nations. The relation between American and European storms is not quite well established, nor can the law governing those questions be settled until means for securing frequent observations and meteorological data from the storm areas of the ocean are provided. It is believed that, with an international weather service extending around the world, correct predictions for several days in advance of a storm will become the rule rather than the exception. The meteorological bureaus of England and Germany are manifesting great interest in the matter, and those scientific bodies of the Old World naturally look to this country for countenance and support.

Several different models of vessels for this purpose have been suggested, all agreeing in the general arrangement of the vessel, which should be buoy like in form, or rounded, and with a flat bottom, and strongly built of the best iron. A convex top having a pitch of 30 degrees supports a tubular iron frame-work, at the top of which is placed the lantern and lighting apparatus, the latter being a Fresnel or electric arc light of great candle-power, forming a beacon unequaled in brilliancy and intensity. The electricity would be generated either by an oil motor, or it could be supplied by power derived from a wind-mill, which would run a dynamo-electric machine, and it is said that the energy developed in daytime could be stored up in an electric accumulator or secondary battery for distribution at night in the illumination of the signal lamp. For signaling in thick or foggy weather a peculiar steam siren or whistle has been proposed, producing a sound which in calm weather is said to be heard at a distance of 25 miles, and is acknowledged the most perfect fog-signal ever invented. The skeleton-like frame-work, presenting as it does the least possible surface of resistance to the elements, reduces the liability of severe strain upon the hull to a minimum. The vessel is to be submerged to a depth sufficient to establish and maintain an equilibrium as nearly perfect as possible. For regulating the depth of submersion two large tanks, with a capacity of many hundred tons of water-ballast, will be placed in the lower hold. The construction of the vessel above the water is to be armored, and being circular in shape, with the convex deck, it offers no point of resistance to the sea, which might sweep against it with all its fury without much risk of damage to the station or harm to those on board.

The fact of its being so nearly submerged renders it unlikely, and almost impossible, that it could ever receive very great strain.

The motion in heavy weather would, it is thought, be slow and easy, and with no perceptible strain upon either hull or mooring cable. It is admitted by naval experts that this form of station has fine sea-service qualities, and would beyond doubt safely ride through the fiercest Atlantic gale or Indian typhoon.

Particular attention is paid in this model to the ventilation of the vessel. Two tubular columns are fitted with fan-wheels, calculated to supply 7,500 cubic feet of air per minute, supplying fresh air sufficient for all necessities, while the other exhausts the foul air and gases accumulating below deck. Conduits from each of the air-shafts extend to

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every compartment in the hull. The remainder of the columns are utilized as steam-pipes, smoke-stacks, &c., one of them being used as a companion-way to the signal and lookout-room just beneath the lantern. The interior of the station is divided by decks, as in other vessels, con-

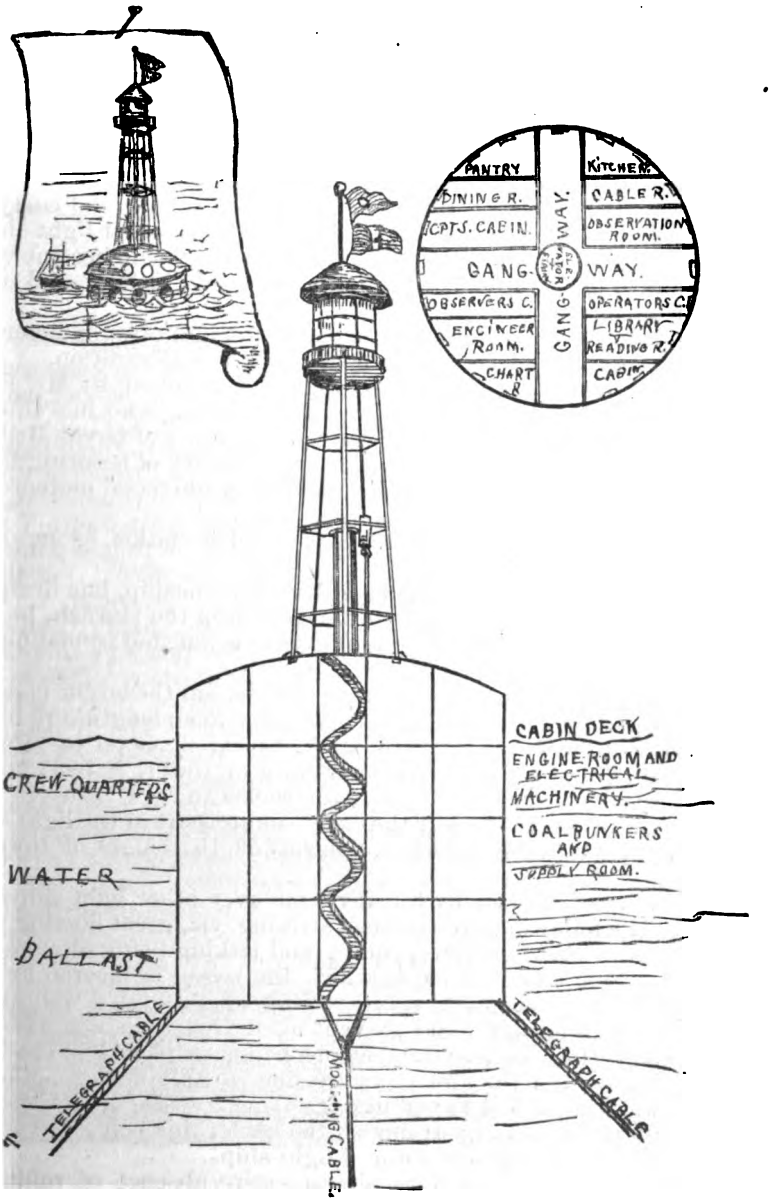

FIG. 12.—The plan of an ocean semaphore.

taining cabins, scientific and operating departments, machinery, electrical and engine rooms, and will be lighted throughout by the incandescent system of electric lighting, in addition to "dead-lights" on

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the main deck. For deep-sea mooring a light steel cable of small diameter is designed in connection with the mushroom-form of anchor. The great buoyancy of the station renders it possible to sustain the weight of the single mooring cable. The extreme length of cable necessary to moor in the ocean depths obviates the necessity for more than one cable; at the same time constitutes a drag which removes liability to sudden strain upon either hull or anchor.

In providing electrical communications with the stations a submarine telegraph cable will be laid and connected with each station and the mainland. Chafing or straining of the cable is avoided by the use of a secondary section of cable running from the ocean-bed to the surface, where it is buoyed in the immediate vicinity of the ship, from which direct communications are made with the station.

The stations will be numbered for identification by day and carrying distinguishing lights by night in a manner similar to coast light-ships, and being located in a known latitude and longitude, would become valuable as points of departure for navigators, and would be indicated upon charts used by mariners.

A corpsof meteorological observers, operators, and crew sufficient to perform all necessary duties would be attached to each station.

The plan as described above was originally designed by Mr. F. A. Cloudman, a well-known meteorologist of New York, who has submitted models explaining his system to the Governments of Great Britain, France, Germany, and the United States, with a view of securing international co-operation and the establishment of a universal meteorological service.

Below is a rough sketch of the proposed vessel or station, as arranged by Mr. Cloudman.

Captain Moody, the commander of a British steamship, has designed a vessel, for the same general purpose, resembling the starfish, having a circular flat bottom, with four stems or rays sweeping out from different points.

These light-vessels might be of different sizes, but the larger class for sea used to have the following dimensions: Extreme length and beam, 80 feet; depth, 13 feet; height of bulwark, 4 feet; diameter of circular cabin, 30 feet; depth of hold, 5 feet; draught of water, 2½ feet; height of lantern above water-line, 60 feet; storerooms in rays, 20 by 15 feet. A model, built of steel, which is the exact counterpart of the light-ship, is 4 feet 2 inches by 4 feet 2 inches, 8 inches depth; height of tower, 3 feet.

The advantages claimed by the inventor over other light-ships are numerous. The following are the most striking, viz, great floating powers, with light draught of water, rolling and jerking being obviated by the peculiar shape and position in which the vessel is moored by four separate cables, the telegraph cable coming up through a well in the center of the vessel, and thus preventing it from twisting with the mooring cables, the cables to the anchors being so placed in the body of the ship as to allow the four bows freedom to follow the motion of the waves, and thus avoid the plunging of her "noses" under the sea and the consequent jerking strains on the cable, this being the principal difficulty with the present form of light-ships.

It is claimed that there will be almost entire absence of rolling or pitching in the Moody light-ship, rising and falling naturally with the waves as she will.

Boarding her in any weather is thought to be quite possible by pouring oil out to the windward with a powerful hand-pump and approach-

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ing in boats on the lee side, when from the shape and form of the vessel the seas would be much broken. When intended for mooring in midocean the four cables could be attached to cylinders or buoys sunk to a certain depth in still water, and these again would have strong cables with anchors; the ship to be constructed with water-tight compartments, and the cabin to be well lighted and ventilated. The lantern-tower is of steel, while strong steel-wire ropes to act as stays are fixed from the hull.

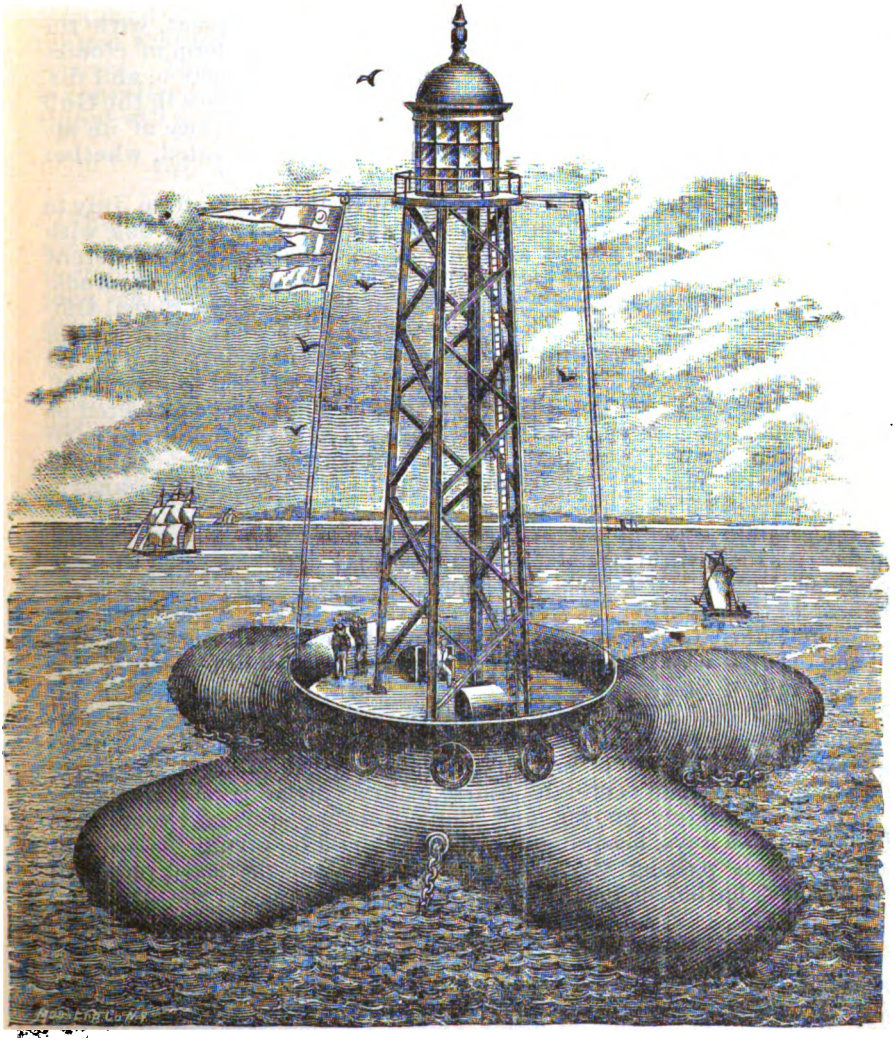

FIG. 13.--Captain Moody's model ocean semaphore.

HURRICANE SIGNALS.

A kindred subject that may be mentioned in connection with the establishment of ocean semaphores, and which may demand international legislation, is a system of storm-signal stations in the West India

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Islands. It has long been known that a large majority of the storms known as hurricanes, which reach our coast late in the summer or fall, have their inception in the vicinity of Barbadoes.

Lieutenant-Commander Winn, U. S. N., who is said to have made a close study of the question, believes that many lives and much valuable property might be saved by having proper signal stations throughout the archipelago, and suggests that there be established throughout the islands of the Caribbean Sea an organized system of hourly observations by trained observers, starting at Barbadoes as the initial point. From thence, or any of the West India Islands, all connected by cable, a hurricane could be accurately traced from point to point, with the height and changes of the barometer and thermometer, form of clouds, humidity, &c. With these data the course, velocity, direction, and distance of center could be accurately obtained, so that vessels in the Gulf or farther north could receive at least thirty-six hours' notice of its approach, and ascertain from the general direction, as indicated, whether it is likely to pass near them.

It has been suggested that during the hurricane season, from July to October 20, a special hurricane signal be adopted (say, white flag with black center, hoisted above), and this would indicate a quite different character of storm, as now indicated by the cautionary or dangerous-wind signal. In the summer and autumn of 1882 the Chief Signal Officer took steps to carry out such a signal service by means of instructions issued to various consuls, ship-masters, and agents as could be employed; but since then, for lack of funds, he has been compelled to give it up. During the period mentioned the reports thus made were considered of great value to commerce, and the warnings given were thought to have saved much damage to property and the loss of many lives. Thus the importance of such early notice of the approach of these hurricanes is said to have been already shown.

Telegraphic communication already exists between most of the islands. As these various islands are the property of the English, French, Spanish, Dutch, and Danish Governments, it would be of the greatest benefit to the countries, as well as ourselves, if some international legislation could be enacted whereby each would bear a proportionate part of the expense of transmitting storm warnings through the West Indies to the United States, and thence to all parts of Europe. With an arrangement of this kind effected, upon the first indications of approaching hurricane, originatingi n the neighborhood of Barbadoes, by telegraphing from point to point all the meteorological changes, the force, direction, distance of center, its course, with its diameter or dimensions, could be accurately known, and ample warning of from twenty-four hours to three days, according to distance, could be given. This would allow vessels passing storm-signal stations along the coast plenty of time to seek harbor, or being in port to take advantage of the situation.

STORM SIGNALS OF THE WEATHER BUREAU.

On the 1st of May, 1886, a new system of weather signals came into use by authority of the War Department, by which warnings of the approach of gales and storms will be published by flags during the day and by lanterns at night. The signals are of three kinds, as follows:

(1) *Cautionary;* (2) *Direction;* (3) *On-shore signals.*

The cautionary day signal is a square red flag with a black square in the middle, and for night time a red light.

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It will be hoisted when a velocity of 35 miles per hour is reached by the wind at sea in the vicinity of the station, which is considered to be dangerous to all classes of shipping.

The direction signal is a square flag with one black and a white horizontal stripe. It is only displayed in connection with the cautionary signal flag, and will indicate the direction from which the dangerous wind is expected. The direction signal will appear on the same flagstaff as the cautionary signal. If below the latter, it will show that the direction of the wind expected is from a westerly quarter, if above from an easterly quarter. The on-shore day signal will be a square flag composed of four smaller squares—two white and two black—so arranged that the squares of like color will touch each other only at the corners. This will indicate a wind of from 20 to 35 miles an hour, which is considered dangerous for small craft and tow-barges. A direction signal will not be hoisted with the on-shore.

OIL AS A SAFEGUARD AGAINST DANGEROUS SEAS.

The knowledge of the value of oil when used for calming the sea is not of modern date, although recent investigation has brought its importance before the public and given it credence with seamen. As long ago as the seventh century the Venerable Bede, who exercised much influence on the civilization of his time, reported that a certain bishop who was permitted to work miracles gave a pot of oil to a priest who was to undertake a journey by sea, and that the oil was subsequently "used with magical effect during a tempest and the ship was saved." It was observed by Commander Wilkes, of the United States exploring expedition in 1840, that oil from a whale-ship off the Cape of Good Hope had the effect to quiet the waves in a violent storm.

We have in our time often heard of "pouring oil on the troubled waters," and it seems to have been for years a generally accepted opinion that oil, either from its slippery nature, rendering it more difficult for the wind to take hold of the surface of the water and raise the waves, or from its soothing effect, had a power to lay the sea. But it was not till more recently that the custom of dropping the oil overboard from vessels at sea in a gale was carried into practice. Even now there are some old sailors who would scoff at the idea of smoothing the ruffled waters by any such simple and superficial treatment as spreading a thin and filmy coat of oil over the angry waves. But the proof of the pudding is in the eating thereof. Without experimental knowledge of our own it is often difficult for us to believe in what appears to be marvelous. The phenomena presented by a heavy, rolling, turbulent sea, the relative forces concerned in its action, and just how far this action may be controlled by artificial influences, can only be determined by long continued and oft repeated trials made under every varied circumstance of actual experience by practical observers. Thanks to the efforts of one of the Bureaus of the Navy Department the evidence necessary to establish so important a fact has been fast accumulating.

The United States Hydrographic Office has for some time been collecting important evidence from practical observers which goes to show the great value of oil when used for the purpose of quelling heavy breakers at sea, and data to determine under what circumstances and in what manner its application is most efficacious. Some of the communications received from seamen who have proved the thing by actual trial are so interesting, as well as convincing, that they are published here.

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The use of oil in calming troubled waters has also received considerable attention by the Royal National Life-Boat Institution of Great Britain, as well as by this Government, and has been the subject of several official reports, from which I gather the impression that although the experience afforded by repeated trials, on bars and at the entrance of harbors, has not proved it to be a perfect safeguard against the heavy breakers produced by shoal water, its application in deep water of the open sea has a marked effect in stopping the breaking of heavy seas, leaving the undulations with the harmless roll, usual in a heavy swell where there is little or no wind.

The use of oil in gales of wind on the ocean, whether running before a heavy sea or hove to in a storm, or when found urgent to lower boats for any purpose, has, on nearly all occasions, had a most marked and beneficial effect, so that it seems almost incredible that its use has not become a matter of every-day occurrence.

The result of the experiments made have seemed to show that there is little difference in the effect produced by the various oils of common use, such as linseed, fish, seal, colza, earth oil, &c., and that a very small quantity of oil is sufficient to cover a considerable area with the smooth filmy surface which characterizes the sea soon after the application of oil. It has, however, been observed by some that cod-liver oil spreads out more readily, covers a greater area, and holds together more tenaciously than either raw linseed oil or refined petroleum. The latter is found to soon break up and resolve itself into veins or streaks between which the white-caps will appear as before.

With regard to the manner of applying the oil or distributing it over the water, the most common and probably the simplest method is to have canvas bags made to contain the oil, with small holes to allow it to escape, and hang them over the bows, just low enough to dip in the sea, as the vessel rolls or pitches. This method has been successfully adopted in cases of vessels hove to or scudding in a gale. It has the advantage of being self-acting, and requiring no watching to insure a regular distribution of oil, which can be easily renewed when exhausted.

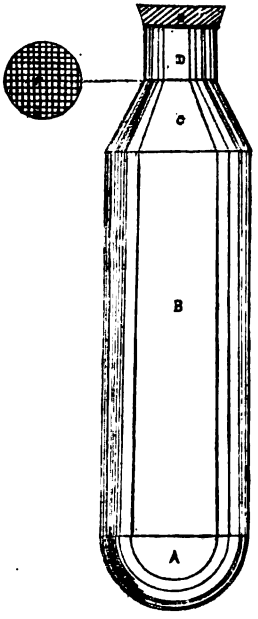

FIG. 14.—Shell for distributing oil at sea.

The experience of our fishermen goes to prove that during bad gales at sea its use is common when their boats or vessels are exposed under circumstances which favor its application. In their experience, when a boat or vessel is lying to in the open ocean, exposed to a dangerous sea and by means of a drogue or otherwise makes a "dead drift," *i. e.*, directly before the wind, the pouring of oil upon the water is an effective means of safety, as under such conditions the craft keeps in the calm surface, over which the oil prevents the sea from breaking, but when working to windward, under short canvas, no great benefit is derived from the use of oil, since the vessel will continually range ahead from the oiled surface into rough water.

What is wanted to insure the general use of oil in the future is the perfecting of some invention that will distribute it in advance of a vessel's course, in such a position that she will range into it. Various ingenious inventions have been

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made for applying the oil to water under different circumstances. Devices are being invented for shooting the oil to windward, the only direction in which it is very slow in moving or refuses to spread.

Figure 14 is a drawing of one of these, the invention of W. D. Baker, of Rockland, Me., which it is thought would be especially useful in the protection of boats at a distance or in keeping the sea down in the vicinity of a wreck. It consists of a perforated shell for holding the oil, which is then to be fired from a gun in the desired direction.

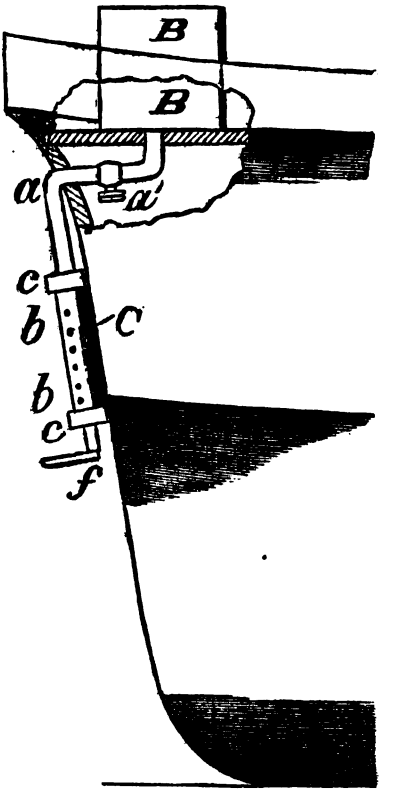

FIG. 14.

The bottom of drawing, marked A, is the bottom made of solid metal, for ballast, to reverse the shell after leaving the gun; B, the body of shell, of thin metal; C and D, neck, in which is placed a wire-screen to regulate the flow of oil; E, cork-stopper to hold the oil till the shell is placed in the gun; F is a wire screw.

The bottom of the shell being the heaviest part, causes it to reverse as soon as it leaves the gun, thus causing an even distribution of oil in any direction that may be desired.

The advantage claimed for this method is that the oil can be distributed in any direction and at a greater distance than any other method known.

Another device for the distribution of oil from vessels in a sea-way has been patented by B. L. Perry, of Wilmington, N. C., the employment of which is shown by the subjoined illustrations.

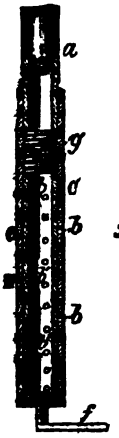

FIG. 15.

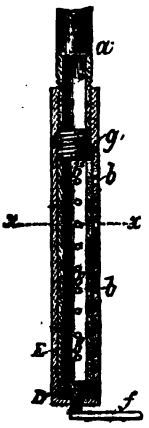

FIG. 16.

Figure 14½ is a side elevation of the hull of a vessel provided with oil-distributing apparatus.

Figure 15 is a vertical section of one of the distributors, in which the ports are shown closed.

Figure 16 is a similar view, in which the parts are shown as registering, or coinciding.

The vessel A is provided with one or more oil-tanks, B B, in which oil may be stored, preferably under pressure. From the tank B the supply pipe *a*, provided with a cock, is extended to the bow of the vessel, where it communicates with the automatic oil-distributer C, the construction and operation of which are as follows:

D is a metallic pipe, secured in a vertical position to the bow of the vessel. The upper end of the pipe is preferably below the level of the deck. The pipe is provided at intervals of its length with elongated perforations, or openings, *b*. The lower end of the pipe is closed, excepting a small hole *e*, provided in its center. The upper end of the pipe

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is interiorly threaded, as shown, to receive the end of the exteriorly threaded end of the supply pipe *a*.

Arranged within the lower portion of the pipe D is a second pipe, B, provided with perforations, or openings, *b'*, corresponding in number and position with the elongated holes *b* in the outer pipe. Secured to the under side of the closed bottom of the inner pipe E is a piston-rod, which passes through the opening *e*, in the bottom of the pipe D, and is provided at its lower end with a horizontal extension or foot, *f*. Resting upon the upper end of the pipe E is a coiled spring, *g*, the upper end of which bears against the lower extremity of the supply pipe *a*.

When in use, the oil is forced from the oil chamber B to the distributor either by pressure contained in the reservoir or by any of the well-known appliances adapted for such use, and fills the inner pipe E of the distributor. As the bow of the vessel is thrown forward by the force of the waves, the foot *f* strikes the wave and is forced upward, carrying with it the inner pipe, E, and causing the perforations *b'* of the inner pipe to register with the corresponding openings *b* in the pipe D, when a jet of oil is forced through each of the openings. The force of the wave having been exhausted, the inner pipe is driven back to its original place by the spring *g*, and the openings *b'* are again closed.

The operation is repeated with each incoming wave, until a sufficient quantity of oil has been discharged to produce the desired effect.

As the invention embraces broadly the idea of discharging oil upon the sea, by means of pressure through perforated pipes secured permanently to the hull of the vessel, it is at once evident that the apparatus described is capable of many modifications and changes without departing from the spirit of the invention.

This automatic distributing device is simple and cheap in construction. It is durable, and being secured firmly to the vessel, is not liable to injury, and is at all times in readiness for use. As the lower portion of the perforated pipes are submerged, excepting as they may be exposed at intervals, when the sea is rough, the danger of their being closed by ice is obviated. Should it at any time be required to regulate the tension of the spring *g*, it may be done by turning the outer pipe, D, and by thus raising or lowering the pipe the spring is compressed or relaxed.

I annex some of the more remarkable accounts of seamen, received and published by the Hydrographic Office, which seem to demonstrate the undoubted efficacy of this means of safety during heavy storms at sea:

In November, 1881, the steamship Venice, from Savannah to Europe with cotton, while running before a heavy northwest gale was boarded by a tremendous sea. The captain determined to heave to, and men were stationed to pour oil down the closet chutes forward, and to throw waste, soaked in oil, to windward. The vessel came round without shipping any water. As she kept falling off, it was concluded to put her again before the sea, which was done without trouble, and it was found that she kept perfectly dry as long as the oil was used. Again, in January, 1884, while crossing the Atlantic to New York, after running before a northwest gale for some time, she was laid to without difficulty or danger by using oil in the manner stated. Captain Jones, of the British steamer Chicago, while rescuing the crew of the brig Fedore, used oil with best results. It was blowing a heavy gale with very high seas. The Chicago ran to windward of the Fedore, and during a lull, oil having been poured on the water, the port life-boat was successfully launched and started. A can of oil was taken in the boat, and by using this the seas were kept down in the immediate vicinity, though they broke in masses of foam a short distance away. As the boat approached the Fedore the crew of that vessel poured oil on the water, which so calmed the sea that the boat came alongside and rescued the shipwrecked crew without sustaining any injury. About half a gallon of oil was used by the boat during her trip.

Capt. George E. Lane writes from Annisquam, Mass., that his father, "during a voyage from Boston to St. Thomas, in an old-fashioned high quarter-deck topsail schooner,

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called the Mayflower, in September, 1817, was caught in a hurricane when near Anegada, and dismasted. After the masts went over the side they were cut from the vessel to prevent doing damage. The wind was so severe that the boards and planks, the deck load, were blown from the deck like shingles in an ordinary gale. During all this time the schooner lay comparatively easy, so far as the sea was concerned, as he took the oil-jug (in those days they burned oil in the binnacle and candles in the cabin) and inserted a quill through the cork, secured it bottom up, and let it drip out drop by drop, which had the desired effect in keeping the sea quite smooth about the vessel during the hurricane, which lasted several hours. The mainmast broke off above the sail; therefore, with the main boom and gaff a jury-mast was rigged, and in due time St. Thomas was reached in safety, with the cargo in the hold in good order. The vessel did not strain or leak during the gale, as she lay quite easy, not a sea boarding her during the time. Of course it was the oil that stilled the troubled waters. In 1845 I was in Rio de Janeiro when a shipwrecked crew reached that port. They had been wrecked on the reefs just north of Cape Frio. The captain said the way he landed in the long-boat was by using oil from the wreck to the shore, the oil causing a 'slick' on the water, not a sea breaking until within a few yards from the shore, when one broke, capsizing the boat, but the whole crew reached the beach in safety.

"I followed the sea constantly over thirty-five years, from cabin-boy to master. During that time had occasion to use it (oil) several times, always to great advantage. When making a passage in 1869 from Caldera to Hamburg, deeply laden with copper and silver ore, when passing Cape Horn during a furious gale from the westward, scudding before it, the sea was so high and dangerous that I did not dare to bring the ship to the wind for fear of having the decks swept. One sea boarded us over the stern, doing considerable damage. I thought of what my father told me about the oil. We used it freely, and had no more trouble with seas breaking dangerously near. On the same passage had another gale, in about 40° S., when we used it for a few hours during a short sharp blow from WSW., during which we lay to."

Captain Walker, of steamship Para, thinks his vessel was saved on two occasions by the use of oil. In one instance he was running before a heavy gale in the Formosa Channel, China, and the sea was remarkably high. His vessel was in great danger of being pooped, as she was coal laden and very deep. He concluded to try oil, and hung two canvas bags filled with it upon each quarter. Sufficient oil oozed through to answer his purpose, and the sea ceased breaking at once. Only four or five gallons were expended in twelve hours.

Capt. James Ritchie reports that, while in command of the ship Myrtle Holme, during a voyage from Portland, Oreg., to Queenstown, he used oil with great success on three occasions. While crossing the Burdwood Banks the sea was so heavy that the man at the helm had to be lashed to prevent being washed away. A canvas bag, perforated with a sail-needle, holding about half a gallon of common lamp-oil, was hung from each main-yard arm. Two minutes after there was no more broken water, and the ship went along as dry as possible, although a short distance away the sea was the same as before. Again, during the same voyage, while hove-to about 10 days off the Western Islands, two more bags were put over. This time the canvas was not perforated and the mouths of the bags were tightly closed. One was put over forward of the fore-rigging and the other abaft the mizzen-rigging, each attached to about 20 feet of line. The surface of the sea became smooth immediately, and the ship lay without taking any water on board. Just before sighting Fastnet Light, during a heavy gale from southwest, the same bags were hung from the bumkin, with about a fathom of line, so they dipped into the water as the stern rose and fell. Although the sea was very heavy, the ship ran without difficulty and kept perfectly dry. Very little oil was used on all these occasions, and Captain Ritchie is of the opinion that it is of the greatest service while running and when hove-to.

During the passage of the United States schooner Onnalaska from San Francisco to Aleutian Islands, between April 13 and May 20, 1884, oil was used in the following manner to modify the action of the sea:

A triangular sail, with a drop of 6 feet, was lashed to the steam-cutter's mast, leaving about 2 feet of spar at each end. To the opposite angle of the sail was hung a 70-pound boat-anchor. From the three corners of the sail were led the lines which made the bridle, which was made fast to a 4-inch hawser. A navy clothes-bag, punched irregularly with a needle, was partly filled with five gallons of lard oil, and the mouth sewed up. This was slung by a span from the ends of the mast so as to ride opposite to the center of it. The whole apparatus was put overboard with 65 fathoms of line, the schooner being at the time under a close-reefed triangular mainsail. It tended three points off the weather bow, keeping the schooner within three or four points of the wind. The motion of the waves working the bag caused the oil to squirt out through the needle-holes, so that the heaviest combing seas were immediately smoothed on coming in contact with the oil, and reached the vessel more like groundswells than waves due to a severe gale.

In 1881, Captain Black, of the British ship Lord Kinnard, was caught in a severe gale in the Baltic. He filled a canvas bag with oil and let it drag astern. The oil

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become thick like tallow and did very little good. He then filled two woolen sacks and hung them to the bumkins. The drippings from the sack soon reduced a heavy cross-sea to a smooth swell, the sea no longer breaking.

The British steamship North Anglia, from St. Jago, Cuba, to Philadelphia, on January 6, encountered a terrific gale. The vessel was brought head to wind, but the high seas broke over the rail and kept the deck flooded. Captain Mumford stationed a man in each closet forward to pour sperm oil down the pipes. This oil became thick as soon as it struck the water, and did no good. Oakum was then dipped into paint-oil, and it was allowed to drip into the pipes. The decks then became as dry as in fine weather. The oil was used from 7 a. m. until 4 p. m.

Mr. G. Foster Howell, of New York, sends a very interesting account of the use of oil while off Cape Horn in the ship Cavalier in 1876. "The ship had been run too long, and heavy seas were constantly boarding her. At last one, more powerful than the rest, rushed upon her with awful violence and started the deck. At the writer's suggestion oil-bags were towed overboard with about 25 feet of line, one on each quarter and one amidships. No sooner had the oil commenced to leak than the sea ceased to boil and rage, and the waves became so harmless that they no longer broke upon us."

Captain Amlot, of the British steamer Barrowmore, reports that, on approaching the ship Kirkwood, on January 24, in latitude 50° 41′ N., longitude 21° 00′ W., the sea was very heavy, but he noticed that around the wreck the sea was much smoother, and discovered that the crew of the Kirkwood, to prevent the waves breaking over them, had broken out the cargo of canned salmon and were pouring the oil from the cans into the sea.

Captain Amlot steamed to windward of the wreck in the oily water, lowered his life-boat, then ran to leeward and picked up his boat. He made two trips in this way, bringing off the crew of twenty-six men.

Captain Almot says he has orders to have two bags ready for use at all times. In running before a heavy sea he has lowered them over the stern, and invariably the sea became much smoother, and he could run without much danger of being pooped.

On this 12th of January, 1885, the American bark Albemarle, Captain Forbes, was thrown on her beam-ends during a furious squall. The vessel was put before the wind and, to diminish the action of the sea, which was breaking on board continually, ten gallons of kerosene oil were poured overboard. This had but little effect on the breaking waves.

In regard to this subject, Captain Forbes makes the following remarks: "To use oil effectually, I think it should be distributed from the forward part of the vessel. A five-gallon tank should be put on the top-gallant forecastle, with two half-inch delivery-pipes—one on each side of the stem. These pipes can be fixed permanently, as the old head-pump was fixed, by a groove in the wood, covered with metal, a rose at the bottom, or distributing point. When the vessel is scudding before the wind and sea the oil passes on each side. If it has any efficacy it will be exerted as the sea rolls up. The tank can be removed at pleasure, leaving the pipes as fixtures. The oil should be of the heaviest description, and if a small hawser is towed astern at the same time it will be found beneficial in steering the ship, and also it has a tendency to break the sea before it reaches the vessel. The hawser should be paid out about 60 fathoms."

Captain Hundewadt, of the steamship Wandrahm, reports that on a voyage from New York to Antwerp, January 18 to 22, 1885, between 45° N. and 53° 30′ W., and 47° N. and 30° 30′ W., he passed through a very heavy gale veering from SSE. to SE., then through S. and W. quarter to NNW., blowing a hurricane from NW. for 14 hours.

During the last thirty-six hours a frightful sea was raised and commenced breaking over the stern, although the vessel was making eleven knots before the wind. At intervals of four hours it was observed that the water aft became remarkably smooth, and looked as if covered with some oily substance. On looking over the side it was observed that the bilge-pumps discharged some oily water. These were working at the time in No. 1 hold, which is not fitted with water-ballast tanks, and which contained 500 barrels of lubricating oil in the bottom. It could not be doubted, therefore, that this cargo was slightly leaking. Captain Hundewadt says he was fully satisfied by this accidental demonstration that oil has full command of breaking seas.

Capt. Charles Moore, of the British bark Siddartha, writes that "on the passage from Cadiz, deep-loaded with salt, I got into a heavy gale in latitude 44° 50′ N., longitude 39° 30′ W., June 7, and it continued for four days, during which time the sea was very heavy indeed, and very irregular. When I found the ship making bad weather and shipping heavy seas, I had recourse to oil bags, with usual effect, and for the balance of the gale had no anxiety whatever. My chief officer, who had not seen it used previously, was simply amazed, and now declares when he is master he will always lay in a stock of oil for this purpose.

"I used it in my usual way—that is, a common bag, partially filled with oakum saturated with oil, was lashed above the water, where it slowly dripped into the sea and did not wash out too fast.

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"I believe tanks for the purpose could be so placed on a ship that they would feed a small pipe slowly, taking up very little room and being always ready for use."

The surveying steamer Vixen was saved from foundering in November, 1861, when she was in the great gale between Hatteras and Lookout, which scattered the Port Royal expedition, reducing the number of vessels in sight from the flagship from 49 to 7. In that case the vessel was hove-to with a drag out astern. The waves were combing and began to break inboard. A swab was hung out on the lee side, upon the guard abaft the paddle-wheel, and an oil-can fitted to drop a small stream of oil upon the swab. The oil soon began to form a scum all around the vessel, and drifted to leeward as the vessel drifted, holding its place around her, and not a sea combed inboard afterwards. The little steamer weathered the gale successfully, and arrived at Port Royal before the Wabash.

A gentleman from Newburyport, Mass., reports the following about the use of oil on the rollers at Newburyport Bar: "It was about two-thirds flood-tide; wind S. E., moderate; heavy swell from the eastward and heavy rollers on the bar, so heavy that vessels inside would not attempt to come out. The craft in question was a sloop yacht of about 16 tons, and used about two quarts of kerosene, poured out of a can quite freely over the port (weather) quarter. The vessel was on the middle roller, which the oil apparently calmed down, so that there was no breaking of the sea, while the roller immediately ahead broke, and the one following also. The yacht passed in safety."

Capt. John P. Holdich, R. N. R., writes as follows:

Captain Mitchell, commanding the English steamer Mentmore, states that, on his voyage from Baltimore to Liverpool, during a heavy westerly gale, he used oil-bags with remarkable effect. He hung one forward and one aft. The ship had been rolling heavily and taking large quantities of water on deck, but in a few minutes after placing the bags over the ship's side she rode quite easily and shipped no more water.

In reporting the gale of August 29, 1683, the Cape Ann Advertiser says, in regard to the experience of the schooner Sigfrid, Capt. Henry Thorpe:

"The sea was the roughest the men ever saw, and we came near swamping several times. The oil in the butts and some kerosene oil were allowed to trickle overboard, which had a good effect in calming the huge waves and in rendering them powerless for danger."

Captain Hill, master of the bark Neptune, *en route* from Cienfuegos, Cuba, to Boston, experienced a very heavy gale from the WSW. The vessel was under reefed topsails and reefed foresail scudding. The seas were tumbling aboard in an alarming manner, so as to endanger life and property. Determined to try what effect oil would have on the seas, had two hempen burlap bags made, 3 feet long and 10 inches wide, and roped them with the ratline stuff. Filled each bag half full with oakum and poured two quarts of pine or wood oil in each one. The bags were hung from the catheads, low enough to be just awash. The effect was simply marvelous. Scarcely a drop of water came on board after putting the bags out. The reefs were shaken out, and we made 289 miles on our course that 24 hours. This was January 30, 1886, in latitude 34° N., longitude 74° W. The bags were put over at 8 a. m. and kept out for sixteen hours, in that time using about six quarts of oil.

Same vessel, same voyage, February 4, 1886, latitude 41° N., longitude 68° 25′, a terrible gale from the northeast, seas sweeping fore and aft the deck and freezing. Was lying to under lower main topsail. In this instance four bags were used, two forward at each cathead, and two aft at each bumpkin. It had the same effect as in the previous case, and, in my opinion, the bark was saved from total destruction by the use of oil.

Captain Hill states that he was induced to try what effect oil would have through the representations received from the Hydrograpic Office, and also through the January Pilot Chart, which he got from the United States consul at Cienfuegos. He says: "Hereafter I purpose having a barrel of oil always ready for use in bad weather on every vessel I may command."

Capt. William Peake, master of the schooner J. F. Krantz, making passage from Port Spain, Trinidad, to Boston, on December 26, 1885, 15 miles east of Hatteras, had a terrible gale from the NNE. The sails were blown away, men washed away from the pumps, boat and other things on deck wrecked by the heavy seas, &c.; was compelled to head to the southward and scud under bare poles; determined to see what effect oil would have on the seas; used two common wooden kegs, capacity about 10 gallons each; bored a small hole for vent in head and a similar one in bottom for the oil to ooze from. In each keg was put 8 gallons of boiled linseed-oil, and then they were lashed on the quarters of the vessel. The oil-vent was just large enough to allow not much more than a drop at a time to ooze out. The effect was all that could be desired. Scarcely a drop of water came on board, the men returned to the pumps, vessel pumped out, and the deck cleared up.

The oil was used for sixteen hours, from 2 a. m. to 6 p. m., and in that time about 8 gallons, all told, were expended.

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The same master, same vessel, in August, 1883, in the hurricane which proved so destructive to the fishing vessels on the Banks, was lying to under trysail and close-reefed mainsail. The seas were very heavy and tumbling on board in all directions and washing everything about the deck. Got a common canvas clothes-bag, punched a small hole in the bottom, filled the bag with oakum, and then poured in a quantity of common deck varnish. This bag was suspended from the martingale and allowed to just clear the water. Kept the bag out just twenty-four hours, and used in that time about 4 gallons of the varnish. From the position of the bag the varnish had very little time to act on the combers before the seas reached the bows; still it had a marked effect on them, so much so that the vessel was no longer boarded by the heavy seas, although they (the seas) were running just as high, and the crew returned to the pumps and other work without risk to life and limb.

Mr. S. S. Collins, late master of the schooner Lucknow, reports:

While bound to Provincetown from a fishing trip on the Banks, we encountered a very severe gale from the northward. The seas became so heavy, sweeping everything fore and aft the decks, that we were compelled to lay to with a sea anchor formed by lashing planks to an anchor and veering to 180 fathoms cable. We then threw oil from the "gurry" butt over the bows as far as possible, which completely smoothed down the combers, and the vessel rode out the gale in safety. My opinion is that the vessel was saved from destruction by the free use of "gurry." I would earnestly recommend the use of oil as a means of safety to life and property.

Captain Kuhn, of the German steamer Polynesia, from Hamburg for New York in 1885, reports as follows:

We sailed from Hamburg on July 31 with 249 steerage passengers, and had fine weather until we reached the Banks. On August 10, in latitude 43°, longitude 53.30°, a terrific cyclone swept down on us. We were somewhat prepared for it, however. At 4 o'clock in the morning the barometer stood at 31.10. By 8 o'clock, or in four hours, it had fallen to 29.60, a half inch. This in the summer weather means a storm, and, taking the warning, I ordered all the hatches to be closed down and to prepare for a hurricane. The barometer still continued to fall fast. The lowest it got to during the gale was 29.10. At 10 o'clock the wind suddenly swept down on us in a perfect fury, and in a moment the sea ran mountains high. I immediately ordered the engines to stop, and decided to lay to until the cyclone had passed, feeling assured it would only last a few hours, and that if we went ahead we should get the full force of it. The wind first struck us from the southeast and the sea was lashed into a perfect fury. Wave after wave dashed on our starboard bow, but we managed to keep her head in such a position that little harm was done. At 10 o'clock the wind suddenly shifted to the southward, and a terrific breaker, looking like a huge mountain of water, broke over our starboard bow. I tell you, sir, it unnerved me for a moment. I have never seen anything so terrific. I have seen gales off Mauritius, and any one who has been to sea knows they are bad enough; but this beat them all. The water fell with a crash on the deck, knocked down the seamen who were on duty, and hurled them against the bulwarks. It swept the deck from stem to stern, carried away a companion hatch, and poured into the cabins, causing a panic among the passengers, who were kept below. It knocked down the chief steward and broke his leg, and also carried away the ladder leading to the spar deck. I think if another wave had immediately followed this we should have gone down. We got her head righted again and continued to receive the breakers on our deck for some time, the wind at the same time tearing through our rigging at a fearful rate. At midday another huge breaker broke with full force on our bow. It carried away a boat and the main gaff and all movable articles on deck. I saw that something must be done to try and stop this, and decided to try the effects of oil. A tank of paint oil was placed on the starboard side of the ship and the oil allowed to leak out. The effect was marvelous. It gradually spread over the water and quieted it right down. The oil spread over a large space around the vessel and quelled the storm entirely. The cyclone lasted for eight hours, passing off to the northwest.

[Letter from Ebenezer Walker, Port Adelaide, July, 1885.]

The first time I saw oil applied was in 1883, when I was coming here from London, in the Beltana. There was a very heavy sea on, and we were running and shipping a good deal of water. Being afraid of pooping we thought of the oil. We put into a bag the only kind we had on board, lamp and paint oil. The bag was a canvas one, 2 feet deep, 2 feet across, and with a round bottom in which holes were pierced. It was previously filled with oakum and then about a gallon of oil poured in. These bags (we had two) were hung one on each quarter, about four or five feet down. It is not well to have it too low, because it is liable to be washed aboard. We kept the

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bag over the side until the weather moderated (about twenty-four hours), and filled it up when required, using altogether about four or five gallons. The effect was good, for the sea for a considerable distance astren was smoothed down and did not break on board as before. We shipped no heavy sea afterwards. The master of the vessel is dead, but he was recommended by another captain to use the oil. Every one on board was pleased with the result.

On the next occasion we were on the way out here in the same ship and master. We had a heavy gale running down her easting, and she shipped a tremendous sea just before the quarter. It filled her right up, smashed two boats to pieces, and did other damage. After that the master had the bags (as before described) put over the quarter, and we then ran all night without shipping any water that could do any damage. At daylight she was hove to, and we still used the bags, one in the lee fore-rigging and the other on the lee quarter. As she drifted, the oil met the seas and prevented them breaking on board, as they must have done if the oil had not been used. We used the oil about twenty-four hours, during which time we derived much benefit from it. Most of them on board had never seen it used before, and were much pleased with it.

On the way home she took a heavy sea on board which filled her up, took a boat off the skids and smashed it up, and washed a man overboard. The oil was afterwards used, and no other damage was sustained.

I think fish oil is the best to use.

W. H. Davies, Port Adelaide * * * states:

In reply to your request I have much pleasure in furnishing you with the following particulars, viz:

That I have been now thirty-two years at sea, but until this last ten years I have never heard of oil being used at sea in heavy gales. Since then I have tried it on several occasions with wonderful effect in the heavy and dangerous seas met with north and south of latitude 40°. I may say that I have tried the effect in a moderate gale, not for fear of the sea disabling the ship, but that I might discover the best way of using the oil bags.

My last experiment was last year, between New Zealand and Cape Horn; ship under lower topsails, with a heavy beam sea, and at times breaking over the decks and filling them with water. I then hung our oil bags over the bows from our weather jib-stays, just letting the bags dip in the water as the ship rolled. No sooner did the oil have time to spread on the water to windward of the ship than the sea became quite smooth, when the oil could be seen in patches alongside the ship, and in a few minutes our weather sail was quite dry. It struck me at the time what a grand opportunity to get at a leak if required, as there appeared to be no danger for a man to be over the side in a bowline. I cannot speak too highly in favor of oil being used in the heavy and dangerous seas met with by ships bound round Cape Horn and the Cape of Good Hope, and feel sure it would be more used were it not for the scarcity of oil on board ship, although in several of my experiments I have found a gallon of oil to last about four hours. The bags used should be made oblong, or in the shape of a nun-buoy, and roped round with the mouth at the lower end, to be tied with a good yarn, regulated to allow the oil to drop freely, but not run; the bag to be made of common canvas and large enough to contain about one gallon. I have tried *all kinds* of oil, but none equals the common fish lamp-oil, as it does not get thick in cold weather, and appeared to me to have the more desired effect on the water.

Ships running should have a small spar rigged out on either quarter, say a boat's mast or a studding-sail yard, with an oil-bag hanging on the ends on both sides to give the oil a greater spread, and out of the wake of the ship, which, in my opinion, would keep the oil from spreading on the surface.

I think if the bags are allowed to tow in the water the pressure on the outside prevents the oil from escaping through the canvas, and leaves the oil discharged in one narrow streak; whereas with the bags *hanging* the wind and spray will throw the oil over a larger space.

The German steamer Polynesia, from Hamburg for New York, reported that she encountered a heavy cyclone from the southward and eastward on August 10, and that heavy seas swept the vessel from stem to stern, carried away companion hatch, injuring several persons, and flooded the saloon with water. Captain Kuhn states as follows:

I decided to try the effect of oil. A tank of paint oil was placed on the starboard side of the ship and the oil allowed to leak out. The effect was marvelous. It gradually spread over a large space around the vessel and quelled the waves entirely. The cyclone lasted eight hours, and passed off to the northwest.

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Capt. E. Matthews, commanding bark Ella, at Portland, Me., sends the following:

In regard to my experience in using oil for the prevention of the breaking of seas over the ship, I will say that several times while lying to in a gale off Cape Horn I have used it with perfect success. By filling a gunny-cloth bag with oakum, saturated with linseed oil, and placing it over the lee bow, so that it was dipped in the sea by the motion of the vessel, I found that as we drifted to leeward the oil covered the surface of the water on the weather bow and prevented the seas from combing and breaking. Have seen the same effect produced by oil slowly dripping from the lee scuppers; and have also tried kerosene, and found that it answered the purpose as well. I firmly believe that oils brought into common use for this purpose would prove a substantial benefit to those who traverse rough waters.

Chief Officer John Swartz, of the German steamer Prinz Leopold, reported to this office that during the prevalence of a heavy WNW. gale in January, 1884, in about latitude 48° N., longitude 15° W., he used oil with good effect. Canvas bags filled with paint-oil were placed over the quarter about 15 feet from the stern. The ship was running before the gale and the sea was very heavy. The oil effectually prevented the sea from breaking over the ship, and she rode quite easily. He now has bags of oil always in readiness in buckets to prevent waste.

Capt. John P. Holdich, R. N. R., wrote:

In April, 1884 (18, 19, and 20), I was homeward bound from Melbourne to Channel for orders, in the ship British Envoy, 1,265 tons. We were at that time off the south end of New Zealand, always a bad place for gales and heavy seas. As the westerly gale increased, so the sea rose, and the squalls, as usual, brought along a little heavy sea with them. The ship was running before it, making good weather till the southwest swell began to make, when some heavy water came on board. I determined to try if oiling the water was any good, and brought up an oil bag made of No. 6 canvas for the purpose, which I filled with three-quarters of a gallon of fish oil, and towed astern by two lead-lines at a distance of fifteen fathoms. Beyond ruining the lead lines, no good whatever followed; the oil and water effectually closed the canvas. I had it hauled on board, made several holes with a large roping-needle, and put it over again. For a minute or two I could see the oil spreading itself very well some distance astern, too far to be of any use to me; indeed, about this time the vessel was heavily pooped and a good deal of damage was done about the decks, which delayed further experiment. Having put all to rights, I next tried more holes and hung the bag over the stern. The oil spread itself as much over the ship as over the sea in this case, so I thought I would try it from the starboard cat-head, as the wind was drawing southerly and the heaviest sea running up from southwest. I made a hole with a large pen-knife, put in more oil, and hung the bag just awash. This was a success; the oil had time to spread to windward before the ship had gone her own length, and no sea ever broke with any force over that smooth patch. I am quite satisfied that towing any oil bag or anything containing oil, say a bundle of oakum, is quite a mistake. It might do good to a ship following closely, but none whatever to the vessel towing it.

I have never tried oil in the case of lying to. When head-reaching the only place is the weather cat-head; but there would be some difficulty in keeping the bag down when drifting. Though I have not tried it, I should put the bag over either forward or aft, according to the direction the worst sea came from.

Another consideration on which I would like information is, What oil produces the best results? Cocoanut oil might be of use in the tropics, but nowhere else; paint-oil soon clogs all small holes, nor does it spread quickly. Colza and olive are good, but what ship now-a-days carries a surplus of these expensive oils for experimenting? Will paraffine be of any use, or is it too thin? Any information on this point would be most acceptable. I found fish oil to answer well, and having some on board should experiment with it again.

The position of the ship was 50° S., and 170° E. to 170° W., when the gale finished.

The following is a letter received from Captain Doyle, of the British steamship Stockholm City:

On November 28, 1885, I left Boston for London, deep with general cargo, and cattle and sheep on the upper deck. At 8.30 p. m. of December 4 we were caught in a heavy storm at NNW., barometer 29.20. The first hour of the storm no canvas could stand it. In latitude 44° 38′ and longitude 48° 28′ W., ship running under bare poles, the sea was then so high and dangerous I resolved to try the use of oil, having had it brought to my notice by information on your chart. I got two common gunny-bags

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and a good wad of oakum wrung out in paint oil, and hung over each quarter, just dipping into the water, also one over the scuppers in the midships. At 10 p. m. I got the lower topsail set, and continued to run till noon next day. By the racing of the engines, my engineer reported to me that he could not run much longer, as the packing of the gland of the high-pressure engine was all worn out. I then got two more farther forward, with a hand in each water-closet forward, dropping oil through; by this means she kept steady on her course, engines stopped, and sailing six knots, while the engineer did his work comfortably. I landed the whole of my cattle alive at Deptford, and never broke any of the cattle pens.

The use of oil I strongly recommend in an emergency; a small drip is of no use. I used one gallon per hour, and had the watch continually going round attending one bag after another.

The result you know, and I hope it will be of use to ship-masters.

[Extracts from letter of J. H. Hook, chief officer of steamship Stockholm City.]

During a recent passage from Boston to London we encountered, on December 4, in latitude 44° 40′, longitude 47° 40′, a terrific westerly storm, which, as it increased in violence, drove up the sea to an enormous height. With the vessel nearly down to her loading marks, and a deck-load of 200 head of cattle, to heave to would have been impossible; our only resource laid in running, but on account of the heavy breaking of the sea this was rendered extremely dangerous. It was then resolved upon to use oil, and a canvas bag containing oakum saturated with linseed oil was hung out on either quarter; in the waist of the ship there were two more placed, and the bowls of the forward water-closet were filled with oakum on which was poured petroleum, thus allowing it to drip through the soil pipes on to the water. The effect of the oil on the seas seemed to be instantaneous, and the most dangerous breaker was transformed into a comparatively harmless swell. During a run of about 170 miles before the gale abated, about 17 gallons of oil were used, and not a drop of water shipped. A great waste of oil must naturally take place in using canvas bags and oakum as means of ejecting the oil, and as ships in general only carry a limited quantity of oil it would be of the highest importance if some more efficient method of letting the oil out on the water were devised. If, for instance, ships, especially steamers, were fitted with a small pipe on either bow and quarter, this pipe to have its outlet through a plate at the loade-line, its upper end to come up through the deck and to be provided with a small funnel-shaped top wherein oil can be poured without that waste which is bound to occur when the canvas bags are to be refilled or the oakum to be resoaked. I have not the slightest doubt that such permanent ejectors, filled with animal or vegetable oil, would go far towards ameliorating the loss of life and property at sea.

The following extract is taken from a Newfoundland paper:

An occurrence took place during the passage hither from Labrador of the English barkentine Zouave, Captain Jones, arrived last night, which illustrated afresh the fact that "throwing oil upon the troubled waters" as a means of producing tranquillity is no figure of speech, but a literal reality. The vessel was laden with fish, and when near the Spotted Islands was overtaken with a hurricane from north-northwest. The captain put a gallon of cod-oil in each one of a couple of four-gallon bags, an oil which was found first rate for the purpose, and making them fast by a towline to the stern, cast them overboard. Previously the waves made clean breaches over the deck, but the effect of the oil leaking from the bags was to prevent the waves breaking and insure a safer condition of navigation. For two days, on Sunday and Monday last, this resource was successfully brought into requisition; and it now looks as if a new employment were discovered for cod-oil, and that a necessary part of a vessel's outfit in future should be a stock of cod-oil for use in "heavy weather."

Captain Brooks, of the English steamer Nymphæa, writes:

About four years ago I was in command of the steamer Nuphan, of 1,280 tons, loaded with a cargo of kerosene oil and bound for India. While crossing the Atlantic we experienced strong westerly gales accompanied with very high seas. I had it in my mind to put the ship head on, but having heard that oil thrown on the sea would calm it, I determined to use it. Having plenty of kerosene oil on board, I poured some on the deck. The water coming on board washed it overboard and immediately the seas became much less, and we ran on without danger until the storm abated.

I recommend that all ship-owners and masters should have on board their vessels a sufficient quantity of oil, independent of their usual stores, for the express purpose of saving lives and property on such extreme occasions.

Capt. J. F. Foss, of the brig Hyperion, of Portland, Me., tells an interesting story of the way in which his vessel rode out a severe storm

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while the waves were kept from breaking over her by bags of oil hung over the sides. Capt. B. J. Willard, the owner of the Hyperion, had told Captain Foss of his belief in the efficacy of oil in breaking the force of the waves, and when in Havana last February Captain Foss had two bags made of canvas, each with a capacity of about 1½ gallons. The bags were made in such a shape that the mouth could be tightly closed and the bag suspended in the water from the vessel's side. On the 25th of February, while on the passage from Havana to New York, the Hyperion encountered a storm, which her commander thinks is the severest he has known for thirty years. The little brig was hove to, and two bags with about a gallon of fish-oil in each were lowered into the water. One was secured to the cat-head on the weather side, and the other on the opposite side of the brig, fastened to the main rigging. Before lowering the bags into the sea, Captain Foss made three small holes in each. The effect was all that could be desired. The waves, instead of breaking on the vessel, became huge rollers, on which the brig rose and fell without shipping any water, until half past three in the afternoon of the following day; then the bag suspended from the main rigging broke, and soon after a heavy sea struck the vessel and washed away the man at the wheel. Captain Foss as quickly as possible got out another bag and rode out the gale in safety. But for the oil the captain of the Hyperion says that the vessel would have been lost in the terrible storm. A bark which left Havana at about the same time as the Hyperion has not been heard of since. The oil in each bag was sufficient to last about twenty-four hours. Captain Foss says that in future his vessel will always carry a stock of oil.

[Letter from W. G. Whetmore, pilot, Port Adelaide.]

The first time I saw the soothing effect of oil on the sea was in the year 1848, when serving my time in a whaling ship in Davis Straits. I have there seen the ship lying to in a gale of wind, cutting in a whale alongside, and the sea for a circle of many miles was quite smooth, caused by the oil from the whale. My next experience was in 1863. I commanded a ship bound from Newcastle to Melbourne. When off Sydney Head I encountered a terrific gale, followed by a tremendous sea, my ship making a great deal of water, and found it necessary to run for a port of shelter. After getting the ship before the wind, the heavy sea that was running sometimes broke over the stern, to the danger of the ship and crew. I then tried oil, but my manner of using it in the first place was wasteful and of no effect, as I tried it with a bottle and jerked it out through a hole in the cork; but I found it blew about the stern of the ship and not in the sea. I then tried the oil-bag, putting about one-half gallon in the bag, tying the neck tight, and towing it astern of the ship. After a short time the effect was wonderful, for what was a very heavy running and dangerous sea was reduced by the use of the oil into what a seaman would call blind rollers, quite harmless to a ship; in fact the effect was so marked that it appeared by looking astern that the vessel was passing through a lane of smooth water. I reported the good effect to my owners and others, but it was not listened to, on the score of expense, as they said it would be used when not necessary. I have used it many times since, with the like success. * * * As to expense, I ran my half-sinking ship from Sydney Heads to Port Stephens, a distance of 68 miles, in eight and a half hours, on a consumption of 2¼ gallons of oil, although my way of using it was wasteful. My subsequent experiences have convinced me that a ship could run in any sea with safety for twenty-four hours on a consumption of 5 gallons of oil. * * * I would especially recommend it for the use of life-boats, as it would enable the crews to perform their work with less risk.

[Letter from Alexander Inglis, harbor-master, Port Adelaide.]

With reference to your circular, I have the honor to state that about twenty years ago, when I took charge of the bark Planter, that vessel had the reputation of being very dangerous when hove to, having several times swept her decks of everything, carrying away bulwarks and stanchions, also some of the crew. The first time that I had occasion to heave her to I tried the oil, having often heard of its effects. The

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oil was placed in a common corn-sack with no holes in it, the oil finding its way through the sacking. It was suspended from the cat-head, and just allowed to dip and skip on the water. The effect was wonderful; it took the top off seas that before were breaking, and the smooth strip could be seen as far as the eye could reach; the result being that, during the four years that I had charge of her, no damage was ever done while hove to, which I attribute to the use of oil when it was necessary. I have on several occasions used it since, and it always had the desired effect.

My experience is that when the vessel had little or no way through the water, the best place for the suspension of the oil-bag is the weather cat-head; with way through the water and when running, the jib-boom or bowsprit end, as the spray from the bow spreads the oil better than when towed aft, or, better still, when running, one from each cat-head.

I found that the corn-sack with no holes in it was better than a canvas bag with holes, as it spreads the oil better, and always tows on its flat. The oil I have used most often was from porpoise blubber and shark livers. I have also used common lamp-oil. Paint-oil does very well, but it is expensive. I have also mixed any of the above with common slush from the galley, and found it answered the purpose very well.

In further illustration of the marvelous effect of oil used during a tropical hurricane, I subjoin letters addressed to me by the collector of the port of New Orleans, describing the late experience of a steamer on her voyage from that port to Truxillo, Honduras:

CUSTOM-HOUSE, NEW ORLEANS, LA.,
Collector's Office, October 28, 1886.

Hon. JARVIS PATTEN,
Commissioner of Navigation, Washington, D. C.:

SIR: I have the honor to submit herewith a communication addressed to this office by Mr. E. Moore, purser of the American steamship Professor Morse, under date of the 27th instant.

Mr. Moore incloses copy of a letter written by a passenger on board of the vessel, giving a graphic account of the perilous position in which the Professor Morse was thrown by force of the wind and waves during the recent hurricane in the Gulf. The use of oil to break the force of the wind on the water was attended with such happy results that I forward the communication in order that it may be made public, if thought proper.

Very respectfully,

B. F. JONAS,
Collector.

NEW ORLEANS, LA., *October 27*, 1886.

Hon. B. F. JONAS,
Collector of Customs, New Orleans, La.:

DEAR SIR: I take the liberty of inclosing to you a copy of a letter written by a passenger on board the American steamship Professor Morse, of which I am the purser, describing the hurricane encountered by us on our last trip to Spanish Honduras, and published in the Times-Democrat of the 22d instant, wherein you will find a graphic account of the perilous position into which our ship was thrown by the violence of the storm, from which the ship and our lives were rescued solely by the use of oil dropped from bags suspended from the rail upon the waters. I am impelled to bring this subject to your notice from a deep sense of its importance to the maritime interests of this country, hoping it may have some influence in bringing about such national legislation as shall make it obligatory upon all vessels sailing under the American flag to be provided with this simple but most valuable means of saving a ship when disabled (as we were), or otherwise, from being swept or engulfed by the waves. Notwithstanding the fact that for thirty hours we were lying helpless in the trough of the sea, which was running mountains high, and but for the oil would have been engulfed without hope of rescue, as no boat could have lived, we lay without a drop of water coming on board, while the angry waves, for a distance of 50 yards to windward, obedient to this natural law, were calm and peaceful. I am aware that this is but one of many instances where the use of oil in a storm at sea has saved the vessel from destruction, and although it merely corroborates a truth already widely known, the testimony herein conveyed may yet be of some value.

Very respectfully, yours,

E. MOORE.

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TRUXILLO, *October* 12, 1886.

MY DEAR FRIEND: We arrived here to-day, after a very stormy passage on board of the steamship Professor Morse. The first part of the voyage across the Gulf of Mexico was very pleasant, and there was nothing in the weather to indicate anything but a pleasant trip and smooth sea to the end. As we passed from the Gulf into the Caribbean Sea the wind, which had been blowing steady from the northeast, gradually increased to a gale and from that to a hurricane, which struck us about 1 a. m. Friday, the 8th. The ship was immediately put before it, and for three hours she actually flew from the roaring wind and sea that followed. The hurricane steadily increased in strength and volume, and at about 4 o'clock a. m. the ship "broached to" and swung up into the wind in spite of all that could be done to prevent it. Immediately upon the commencement of the hurricane Captain Pendleton had two bags filled with oakum and oil put out over the forward part of the ship, which prevented the great seas that were running behind us from breaking over and sweeping the decks.

When she became unmanageable and swung off into the trough of the sea she was in a most perilous situation, as we were entirely at the mercy of the waves, which were running in almost every direction, the wind having shifted gradually from the northward to the southwest, almost completing the circle. Captain Pendleton was fully alive to the situation, and had put out the regulation drag to endeavor to keep the ship's head up to the sea, but to no purpose. He then put out four oil bags on the windward side of the ship, and the oil acted like magic. The sea became smooth for at least 75 yards in that direction, and the ship lay as comfortable as though she were in the Mississippi River. Not a sea broke over us, while ahead and astern and to leeward the ocean was in a wild pandemonium, and the howling of the winds drowned all other sounds. It was fearfully grand and awful. The great waves seemed to be fighting one another, and the air was filled with foaming spray, which was torn from them and thrown up in their frightful combat. The air assumed a grayish hue, as though it were filled with ashes, obstructing the view for any great distance; in fact, to those on board there appeared but one way to look, and that was up. Such a wild weird scene it had never been my fate to witness before, and I sincerely hope that I may never see it again; but if chances shall so order it that I shall be in another such storm, my prayer is that I may be on board of a ship commanded by Captain Pendleton, with his oil bags. It was a verification of a certain text or passage in the Good Book, which says something about pouring oil upon the troubled waters.

It seemed as if the great winds and waves had arranged for a grand ball to take place then and there, and that all the demons of "Hades" (new version) had joined in the dance. It was magnificently horrible, while about us in the direction that danger could come from the sea was as smooth as glass. I cannot finds words with which to fully describe the scene. I sincerely hope that you may never have a like experience. There was no excitement among the officers or crew of the ship, and every order was obeyed cheerfully and promptly.

We lay in the trough of the sea for thirty hours, and during that time nobody closed an eye, and we did not have anything to eat but a few crackers, as it was impossible to cook.

I believe that the ship and the lives of all those on board were saved by the free use of oil; therefore my trust hereafter when on the water will be in God and oil.

With many kind regards, I remain, yours,

L. D. PHILLIPS.

NEW SYSTEMS OF NAVAL CONSTRUCTION.

Among the new systems of constructing boats and other vessels in this age of inventions the plan of Capt. F. L. Norton, of Washington, D. C., appears worthy of favorable mention, especially in its application to life-boats, yachts, and for all classes of vessels that do not require all of their measured tonnage space for cargo.

The chief feature of Captain Norton's invention consists of a series of water-chambers, which open and close by automatic valves and provide for the vessel a self-acting ballast. Above and on the sides of the ballast-chambers are corresponding air-chambers. The air in these side arms or wings of the ballast-chamber cannot escape, and as the vessel is listed from an upright position the air acts as a cushion, easing the motion of the boat and increasing its stability as well as buoyancy. The boat was thoroughly tested last year by the German naval authorities at Wilhelmshaven and at other places in Europe. Favorable reports were

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made, and the system was approved by the Governments of Germany and Holland. Captain Norton's plan has also been examined and tested by a Board of United States naval officers, appointed for that purpose by the Secretary of the Navy, and pronounced very suitable for life-boats. The advantage claimed for boats built after this method are the self-acting ballast, increased stability, increased sailing capacity, good qualities as a sea boat in heavy weather, and greater safety. The repeated trial of the boats of different models and sizes built upon this principle seems to prove its practical as well as scientific availability when applied to boats, yachts, fishing vessels, &c.

The following is incorporated from Captain Norton's description of his invention:

The Norton system of construction is applicable to all classes of boats or vessels, yachts, and passenger steamers, and will be found invaluable in its application to life and ships' boats, pleasure boats, and yachts, as it makes them perfectly safe and reliable in use, and affords a degree of safety that cannot be secured by any other form of construction.

Boats so constructed cannot be capsized by the sea, no matter how rough the weather; they cannot be swamped by overloading or the carelessness of their occupants, nor by the breaking of or damage to their frames.

All boats or vessels so constructed ballast themselves automatically immediately upon being lowered or launched into the water, with a weight of water-ballast proportionate to their displacement.

To secure this result I construct the boat or vessel with, as it were, two distinct frames and plankings or skins. The outer frame is formed upon any desired lines or model consistent with safety and the obtainment of the desired speed. Into the space between the two frames along the bottom and at each side of the keel I place a number of metallic automatically working ballast-chambers, formed to fit the space between the inner and outer frames or planking, thereby obtaining a number of independent ballast-chambers, which arrangement always maintains the equal distribution of the water-ballast along the length of the boat. These automatic ballast-chambers are formed (see drawings) with comparatively narrow arms extending a greater or less distance (according to the class of boat or vessel) around the bends, and with longitudinal openings near to and in a line with the keel. These openings and chambers are so formed and connected with the outer skin or planking as to be perfectly water-tight at such parts, and thereby prevent the admission of water to the space between the two skins. I also form the ballast-chambers deeper along each side of the keel than at other parts, whereby a greater depth and therefore weight of water-ballast is obtained along the line of the keel than elsewhere. To these chambers I connect a small air-pipe, which passes up vertically between the chambers and frames, and is connected with a longitudinal pipe running on each side below the covering-board of the two frames, and fitted with a small air-valve, which permits the air to escape from the ballast-chambers, as the water-ballast enters, while retaining the air in the ascending arms of said chambers. The remainder of the space not filled by the ballast-chambers and between the two frames I fill with hermetically closed air-chambers. They are shaped to fit, or approximately, to such space.

A boat or vessel constructed and fitted in this manner will on being placed in the water automatically receive her water-ballast through the openings in its ballast-chambers, the air in said chambers, except that contained in the arms, being by the entrance of the water forced out, and as the air so forced out cannot return, the water-ballast is retained in position till the boat or vessel is again removed from the water. The necessity for and value of this system of construction cannot be overestimated. Hundreds of valuable lives are yearly lost through the inefficiency of boats now in use on the inland waters and rivers of the world as well as on the high seas. Boat accidents and drownings are of continual occurrence. Ships proceed to sea and are never heard from, because the boats provided by the owners for the safety of crew and passengers are worthless; but the greater part of all this loss of life may be avoided; drownings from the capsizing and swamping of pleasure-boats and yachts should never be heard of; for a boat which will capsize or that can be capsized by the carelessness or want of experience of its occupants should not be, nor allowed to be, used.

The form of boat and class of vessel I now offer to the Governments of the world, ship-owners, and all those who go down to the sea in ships, either for business or recreation, is a perfect life-saving construction, strong, buoyant, of great stability, lightness in the water, and speed, or, in other words, a perfect sea-boat, one that will afford safety to any number of persons that may find room and accommodation in her.

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I have tried one of these boats, 28 feet long, during a stormy night on the North Sea, 20 miles from land, and found her all that I could desire. There is no class of vessel or boat to which the system is not applicable.

And as an evidence that I have not overstated or overestimated the merits of my invention, I submit and introduce some of the testimonials and notices relating to it already received.

NAUTICAL CUSTOMS AND RELATIONS OF OFFICERS AND SEAMEN ON THE NORTHERN LAKES.

In my annual report for the year 1885 some account was given of the rules of discipline maintained in the merchant service, as well as the system of internal economy observed on board sea-going vessels of the United States. But while these customs may be said to have acquired the force of law on the high seas, they do not apply to the navigation of the great lakes. The different sorts of vessels used there, and the comparative shortness of the voyages, quite naturally created a different class of officers and men, who gradually adopted a different code of sea regulations, better suited to the demands of a peculiar navigation. Although the deepening of the channels that used to obstruct the inter-lake communication now permits the use of large vessels, and the size of the ships and steamers employed has been rapidly increasing of late years, the customs adopted by the pioneers in that service has not been altered, and may now be considered as the fixed maritime rule of that particular service.

Shipment and discharge of crews.

The established custom relating to the shipment and discharge of crews on the Northern lakes is different from that in vogue on other navigable waters of the United States. The time for which a crew is shipped is governed by the time of passage between two terminal points, although crews are also shipped by the day. Being shipped for the single trip, crews are discharged at the end of the trip. This is the practice over all the lakes except Lake Superior, the ports of which are not provided with shipping offices; and vessels plying from the lower lakes into the waters of Lake Superior ship their crews for the round trip. It remains optional, however, for crews discharged from a vessel at the end of a trip to reship immediately on the same vessel for the return trip, which practice usually obtains, and in this way the same crew, if satisfactory to the masters or owners, often remain on the same vessel through an entire season.

The term of shipment may be said to last from sixteen to eighteen days, and shipping articles are signed by the crew on each new engagement.

It has not been the practice with masters of lake vessels to pay advance wages, and it is not generally deemed necessary, or asked for by seamen on the lakes, for the reason that supplies, &c, are furnished by the vessel, bedding, provisions, tableware, etc., even to tin cups and plates, being provided for the crew.

Masters are engaged for the season at a fixed salary per month, and there is a tacit understanding between them and their employers that if they are not notified to the contrary in due time (some weeks before the opening of navigation the following year) they are again to have their command of the previous season. Mates and engineers are engaged by the month at a stated salary.

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Quarters on shipboard.

Lake vessels are constructed, as far as may be with regard to comfortable quarters for officers and crew. On passenger steamers, of which there are a large number on the lakes, and steam barges and propellers, the captain usually has a suite of three rooms, with closets, &c., and in the more modern-built boats he is provided with an additional room to be used as a chart room. The engineers have a separate room, light and airy, on the spar-deck, the berths being furnished with wire-woven spring beds and hair mattresses. The mates have a separate room, and the wheelman and watchman bunk together. The cooks have berths together, as do also the firemen and deck hands.

The captain, mates, and cook of sailing vessels room aft in the cabin, the dimensions of which are governed by the size of the vessel; but it is generally adequate to all purposes. The crew are quartered in the forecastle.

The provisions furnished for lake vessels are usually such as the market affords, the quality being good and the supply abundant; in fact, the food is equal to that furnished at any second-rate hotel. The meats consist of fresh and salt beef, veal, lamb and mutton, fresh pork, ham, bacon and sausage, butter, eggs, and cheese, fish, and all kinds of game in season, canned goods, white and Graham flour, corn-meal, rice, and tapioca, the cost per man varying from 29⅜ to 40 cents per day.

On steam-propelled vessels captains, mates, engineers, wheelmen, and lookouts mess together in the cabin aft, which is light and well ventilated, while the firemen mess together in their quarters, the deck-hands also having separate messes. This custom applies also to passenger boats.

On sailing vessels officers and crew generally mess together in the cabin aft, the cook waiting on all at the same table.

Discipline, etc.

While the discipline on lake vessels is not, for obvious reasons, in any regard as strict as that preserved on salt water, all proper and requisite authority is maintained by the master.

While there is room for improvement in some respects, as there is in the ocean service, the seamen now active in the merchant marine of the lakes are generally good, law-abiding citizens, and cases of insubordination rare.

The fact is said to be apparent that the able-bodied sailor is rapidly disappearing from the lakes. He is either seeking service on the sea-going ships or coasting vessels on the ocean, or finding a livelihood in pursuits of a different nature. This condition is accounted for partially by the fact that steam-barges, each taking in tow from one to five consorts, are fast driving schooners, sloops, and brigs from the lakes, the two latter rigs having almost entirely disappeared, and the schooners are annually being deprived of their towering topmast and being converted into tow-barges. These barges, being under the control of the steamers, skilled or able seamen are not considered necessary, and lower-priced men are sought for and employed instead. Thorough seamen are usually averse to coming into competition with those of inferior seamanship, and seek other shores or find other pursuits. It is therefore noticeable on the lakes, as well as in the ocean service, that the men accustomed to sail in steamers are becoming unfitted for the more arduous duties and tedious maneuvers of sailing vessels, and the average

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sailor of to-day cannot, in all respects, perform those parts of his duties connected with sails as he used to do when sails were depended on as the sole means of propulsion.

It will not be out of place here to note, however, that the standard of captains and officers is thought to be not only improving in seamanship in the handling of steam and sail vessels but also in education and the necessary business qualifications.

The same is true of the lake engineers, who are a superior class of mechanics, generally well-educated and full of resources, always noting the merits of their machinery, observing where a ton of coal or a pound of steam may be saved, or a fraction of a mile gained in the handling of their engine.

Religious and moral influence.

In passing to this subject, it is apparent that the ordinary sailor on the lakes is subject to the same influences as surround the sailor on the ocean, and he is governed by the same emotions (though probably exerted in a less degree) as the latter. The inclination of the individual here, as elsewhere, makes his surroundings for better or worse. He has the choice of all principal shipping ports, or ports of discharge, of putting up at the notorious sailors' boarding-house, where he may have his frolic, until his money is exhausted, under the supervision of the accommodating landlord, or he may choose the more respectable temperance house, and occupy his leisure time and improve his mind at the bethel reading-rooms, which are provided for him at all the principal shipping ports on the lakes by subscription, the funds being mostly donated by vessel-owners. Bethel churches have, during the past ten years, been established for the improvement of the condition of the sailor at Buffalo, Cleveland, Detroit, Milwaukee and Chicago, and at other ports the opportunities for gaining spiritual knowledge are equal to the requirements. At Cleveland much progress has been made in the good work, and one of the lowest groggeries in the river quarter, where crime and intemperance were rampant, has been purchased by persons interested in shipping and other charitable people of that city, and converted into a bethel church. The religious services held every Sunday morning and evening are conducted by Chaplain J. D. Jones, a one-armed sailor, who has been instrumental in leading many sailors, apparently lost to religious sentiments and unsettled wanderers in the world, to find peace at the altar of prayer. Connected with the Cleveland bethel is a free reading-room, well supplied with interesting matter, and also a restaurant, where good food is furnished at cost. These facts pertaining to the Cleveland bethel may be applied to the other institutions of like nature at other ports on the lakes.

In addition to the influences at work at these bethels, the gospel ship, Glad Tidings, Captain Bundy, is a power for good. She is furnished and equipped by subscription principally. Captain Bundy's plan consists in cruising during the season of navigation from port to port, holding services and singing gospel hymns on deck, and out of doors usually, always closing the services by extending an invitation for those who have heard the truth to join him in forwarding the good work.

The condition of captains and mates and engineers has improved wonderfully during the last ten years. The more able and economical of each rank have acquired homes for themselves and are highly respected in the community.

It has been thought advisable by the managers of certain lines and lake steamers that their captains and mates should have a more thorough

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knowledge of navigation than has heretofore been deemed essential. A school of navigation has consequently been established at Buffalo, and, under the direction of an able navigator, classes have been organized which are making good progress. The test will not be applied or the result known until the season of 1887, at which time it is understood that preference will be given to those captains and mates who have shown the most proficiency in nautical studies pursued.*

The large and increasing commerce of the lakes is essentially a coasting trade. Vessels of the United States which navigate those waters are enrolled and licensed, and may be employed in the coasting trade or to foreign ports on the Canadian shores of the lakes, and are in other respects subject to the regulations made to prevent any violation of the revenue laws.

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* I am indebted to Mr. A. H. Pomeroy, of the Cleveland Record, for much of the above.

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SEAMEN.

The term "seamen," as used for most purposes in the Revised Statutes, may be said to embrace all persons engaged in any capacity on board any vessel of the merchant marine except the master and therefore includes firemen, stokers, engineers, cooks, stewards, waiters, and stewardesses, as well as sailors and officers. There has never been any statutory definition of the terms "able-bodied seaman," A. B.; "ordinary seaman," O. S.; or "green hand," boy; but it is generally considered that the former should have at least three years' experience at sea and be able to perform any of the most difficult and technical work required of a foremast hand. An ordinary seaman should have at least one year's service at sea, and be able to hand, reef, and steer; while a green hand is a boy, or youngster, on his first voyage.

As more or less trouble arises between the person's composing a ship's crew on account of fraudulent or erroneous rating, it would be a good thing to have the different grades and capacities defined in a general way by statute. In the British service no person is entitled to the rating A. B. unless he can prove four years' service before the mast; and the employment of fishermen in registered vessels having decks only counts as sea service up to the period of three years of such employment, and the rating A. B. in their case is only permitted after one year's actual service in a trading vessel. I think the exaction of so long a term of service would be unnecessary in case of native American seamen; and the additional service of our fishermen, many of whom are among our most enterprising sailors (and some of them rise by their own exertions to be able and competent masters within the term of time mentioned), need not be required. But there is now no way of designating the different grades or qualities of men employed in the service, and they are often shipped, whether good or bad, for the same duties. This practice frequently leads to trouble between the men themselves, and complaints on the part of the officers, who sometimes find themselves at sea with a ship's company composed mostly of green hands. I would suggest, therefore, in the interest of both officers and seamen, that there be a more complete system of grading the persons who compose the crews of our merchant ships, and also that more caution be exercised at the time of paying off the men to have their ratings and characters correctly stated in the discharge-papers that are granted, so that no man may be allowed to ship again in a capacity that he is not competent to fill.

It has been said that "you can make a soldier at short notice out of any healthy man, but it takes time to make a sailor." Moreover, certain peculiarities of constitution or disposition are essential. Some persons are so disposed to sea-sickness as to be quite unsuited to the business of a mariner. The utter uselessness of such men on the rocking waves is illustrated in one of Cooper's books, where he describes a brig at anchor on the northwest coast, being surprised during the night by a boat-load of natives, who murdered all but two of the crew, who were enabled to conceal themselves under the bowsprit. Watching their opportunity, these men cut the cable, when the vessel began drifting out to sea unnoticed by the Indians, who were engaged in plundering. As soon as a projecting headland was passed, which opened to the heavy swell of the Pacific, there was a marked change in the savages; one after the other they fell sick, and in less than an hour all of them were stretched in the scuppers, entirely at the mercy of the two men, who were not slow in dispatching them and retaking the brig.

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The custom of enlisting men indiscriminately for the army and navy, which used to be practiced in some countries, never worked well, and is now mostly abandoned. In Russia, soldiers are still called upon to man the fleet when an extra squadron is called into service. But these men are found to make clumsy sailors. Perhaps this is the reason why that powerful empire, with a formidable fleet, has never been able to get many of her ships beyond the castle of Elsinore on the north and the Golden Horn on the south.

Many landsmen, mariners, &c., are employed in men-of-war, but even these would be the better if they had to go through a special course of preparation for their duties; hence the great need of training-ships to fit lads and young men for sea service.

Under the present arrangement the merchant marine and fisheries (whose vessels are mostly manned by native Americans), are our great preparatory schools for seamen. Unfortunately, however, the introduction of steam navigation has been found to have a pernicious effect in rendering seamen less efficient and capable than in former years, and it is no wonder that maritime nations generally are becoming alarmed lest the supply of a sufficient number of sailors to man their fleets in time of war should fall short.

Various plans have been suggested to relieve this condition of things and make seamen more abundant, the chief of which are the apprentice system and the establishment of training schools; but in addition to these it is recognized to be of the greatest importance that the *morale* of the service be improved by every means practicable, so as to induce more of our respectable youths to join it.

The popular idea of a sailor has been not a little perverted by the theatrical caricatures of the Pinafore order, for which he is gotten up in blue shirt with wide collar, loose-legged trousers, fitting tight at the waist, and tarpaulin hat.

Although the uniform of the man-of-war tar is still somewhat in keeping with this description, sailors in the merchant service support no such toggery; they wear what they can get, usually the coarse woolen ready-made clothing displayed in the cheap stores that are found near the wharves of any sea-port town. The crews that man American merchant ships now come from all climes, being made up of native and naturalized Americans, English, Irish, Dutch, Scandinavian, Portuguese, and negroes; and as there is no single type to suit all these classes, he may not be easily distinguished from seamen of other nationalities, and certainly not by his dress, or the habit ascribed to the old salt, of hitching up his pantaloons for the want of suspenders, for suspenders are worn as much by seamen as by other classes of laboring men. If there is anything that distinguishes the sailors of our merchant service from those of other countries, it is their well-preserved appearance, the result of good substantial fare, and a certain independent, careless air that is not generally characteristic of any other nation. The seamen of the British mercantile service are more strictly tied down by laws, which repress or punish insubordination, and hence they may have imbibed a certain respect for authority not possessed by our seamen. However this may be, the seamen of all countries bear the same characteristics; and the same looseness as to money matters as well as morals may be said to prevail amongst them as a class.

Mr. Lindsey, who from his great experience in the English service ought to be a good judge, in writing about our seafaring population, remarks that "the native-born American seamen are bold, adventurous, and brave. In their merchant vessels the proportion of native seamen

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is estimated at about one-third, while it was a common remark that the rest were rascally Spaniards, surly John Bulls, Dutchmen, Malays, anything of any country. The American native-born seaman is frequently promoted to be an officer, and sometimes to the command of large ships, but there are perpetual complaints that the people of the United States do not take to the sea with alacrity. Indeed, it is only in the Northeastern States that the sailor's life may be said to belong to the soil itself, and even the natives of that comparatively barren soil and rigorous climate become sailors perhaps less from love of adventure and from their natural hardiness than from necessity. When boys they had perhaps widowed mothers to support, or younger brothers and sisters to care for, and there being no other congenial occupation they went to sea.

"When complaining of his dog's life, the American sits by the hour, whittling a stick and building boats for his child, recounting at the same time the perils and hardships of the sea. * Like the British sailor, he has always his pet ship, by which most of his experience has been acquired, and the name of that ship is oftenest on his lips. It is associated with the story of his love, the memory of his friendships, and he dates all his eras from his several voyages in the vessel of the one loved name. As New England was the great storehouse of seamen, there the best specimens of the seafaring population are to be found. We have seen even in our time the puritanical weather-beaten Boston skipper, once so famous, sharp as a northeaster, dressed in knee-breeches and buckles, with three-cornered cocked hat, only forgetting the pigtail, the very personification of our Commodore Trunnion and Piper, of a century ago. But though they have degenerated since then, the seamen engaged in the deep-sea fisheries are still a remarkably hardy, robust race, and hence have succeeded in that branch of maritime enterprise far more than our own adventurers of late years."

Considerable controversy has been going on of late in regard to the supposed deterioration of seamen, and there appears to be a great difference of opinion on the subject. In fact it is a difficult matter to determine whether the condition of seamen has in all respects improved during the last twenty-five years. It was not satisfactory then, and it is not satisfactory now, but it is thought that in respect to their sobriety and morals, as a class, there is some improvement. The growth of steam navigation has had the effect of separating seamen into two different classes, and many of the men now employed on board steamers would hardly pass for able seamen, and there may probably be found a less abundant supply of first-rate seamen among this class than formerly; but the requirements in steamers are not so exigent, and if the men are equal to the demands made upon them, there cannot be said to be any fault on their part.

A comparison of the efficiency and skill of the seamen of to-day with the same class, as it is presumed to have been, a quarter or half of a century ago, always gives rise to divergent opinions among shipmasters. The older class of captains, who naturally prefer the "good old time" when they were younger, are prone to extol the men and ways of the past, and are naturally apt to disparage the men of a later generation, as well as the methods they adopt. At the same time, the number of men required to man a ship has been gradually lowered, which would seem to prove that the relative value per man, judged by the performance of the crews, had been on the increase. It must be admitted, however, that a considerable number of incapable men are now shipped.

There is an inducement for reckless fellows to go to sea, often to es-

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cape the penalties they have incurred on the land. The nature of the business and manner of conducting it permit any worthless unfortunate to be foisted upon the ship, where, although he may be entirely unacquainted with the duties of a seaman, he has an opportunity to get something in advance for services he is unable to perform, and has his board and lodging furnished by the vessel.

In regard to the relative status of our seamen of to-day compared with that of twenty-five years ago, I have much to say both in their favor and against them. It is unreasonable to condemn a large class of men on account of the misdeeds of a part of them. The American merchant service is made up of a number of discordant and separate elements. In the same ship's forecastle men of a dozen different nationalities are sometimes met with, whose professions and characters are even still more diverse. Among a crew of a dozen, many different characters are found, varying, perhaps, from a convict escaped from prison to a play-actor and a broken-down street preacher.

As may be supposed, a small proportion of the men that make up such crews are native Americans; but with such a motley mass it is wrong to judge them all by the same standard, and it is, of course, difficult to arrive at a just estimate of the character of the whole. It would be necessary either to eliminate a large class of men hanging loosely on the world, who drift about and take up the sailor's vocation as a kind of recreation or pastime, or to strike an average of the whole body.

There is also a great difference in crews shipped at different ports of the United States, but as near as can be ascertained the facts seem to be that the better class of seamen—I mean those who take steady employment in our coasters and large sailing vessels—are an improvement on the seamen of the same class twenty-five years ago. Not an improvement, perhaps, as practical seamen, but that they are morally and physically and socially better, and better able to husband their resources—thanks to the slow, probably, but really effective labors of seamen's friends' societies, and men and women engaged in their reform.

There is, however, a class of men who go in the steamers, a mixture of firemen, coal trimmers, and deck hands, who are no improvement upon the same class a quarter of a century ago, being less efficient and reliable, and badly demoralized from the effects of the bad associations they form in the lower stratum of society in which they may be said to exist, rather than live, during their short stay on shore. This class, many of whom would be satisfied if they could keep out of jail, are with difficulty reached by any ameliorating influences, except perhaps the labors of the Salvation Army or some similar order of reformers. But taken as a whole, I think, from what I see and learn from reports of the different shipping commissioners, I can bear witness that there is a steadily increasing number of sober, orderly, reliable men in the service, men whom it would be a satisfaction and pleasure for the most cultivated and earnest shipmaster to have under his command. This better class of seamen, it is thought, is increasing fast enough to offset the baser element, so that the great body of mariners sailing under the American flag may be said to be gradually advancing in manhood and moral strength and purpose.

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PROPORTION OF AMERICAN AND FOREIGN SEAMEN IN THE SERVICE.

It was enacted in the early legislation of the country that two-thirds of the crew of any vessel of the United States duly registered, &c., should consist of American citizens, or persons not the subjects of any foreign prince or state.

A "protection" was issued at the custom-house to every American seaman making application therefor, who took the required oath by virtue of which he was considered to enjoy certain privileges not common to seamen of foreign birth.

The "protection," which was in the nature of a passport, gave a description of the holder, with his age, birthplace, &c.; and a sufficient number of these documents were required to accompany the clearance papers of every ship. This system in effect encouraged Americans to follow the sea; and it is said to have worked well in the beginning of our maritime history. But after the war of 1812–1815, so great was the development of our maritime interests that the increased demand for our seamen could not be supplied, even after the termination of the European wars when considerable numbers discharged from service in foreign navies sought employment in the American merchant marine.

It was subsequently found to be difficult to obtain crews composed so largely of American citizens, to man our merchant fleet; and in many cases, in order to carry out the law, old "protections" were used for clearance purposes. This state of things continued until by the act of June 28, 1864, it was provided that—

> Discriminations in favor of vessels certain proportions of whose crews shall be citizen of the United States, shall be, and the same are hereby repealed, provided that officers of vessels of the United States shall be citizens of the United States.

Of late years no very accurate record has been kept of the proportion of native and foreign seamen employed in the merchant service. During the past year, however, the shipping commissions have, in answer to questions propounded by this office, returned the approximate numbers shipped at the various ports. The information gathered from these returns has not been so complete as desirable, and does not give the nationalities of the foreigners; but the inquiry will be continued, and interesting and valuable statistics on this point will in time be obtained. From the data received this year, it appears that the proportion of foreigners in the crews of American vessels engaged in the foreign trade—taking the average of all the ports which have reported—is 63 per cent.

There appears also here to be a wide difference between the various ports in this regard—the proportion of foreigners shipped at some places being much greater, than at others. I am informed that the proportion of foreign subjects employed in our foreign-going vessels may be divided nearly as follows:

First, British 25 per cent.; second, Scandinavian 20 per cent.; third, other nationalities (principally Germans), 18 per cent.

The proportion of foreigners employed in our coasting vessels is 46 per centum, as shown by the following tables compiled from the returns of the shipping offices:

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Native and foreign seamen shipped in year ending June 30, 1886.

Ports where shipped.	Shipped coastwise.		Shipped abroad.		Total.	
	American.	Foreign.	American.	Foreign.	American.	Foreign.
New York	549	327	4,713	5,358	5,262	5,685
San Francisco	.....	.....	.....	.....	2,581	6,021
Philadelphia	.....	.....	.....	.....	556	2,200
Baltimore	86	80	302	470	388	490
Boston	.....	.....	.....	.....	115	630
New Orleans	.....	.....	380	461	380	461
Charleston	.....	.....	.....	.....	18	36
Savannah	.....	.....	.....	.....	12	25
Norfolk	.....	.....	.....	.....	426	449
Portland, Me	.....	.....	.....	.....	.....	.....
Bath, Me	89	176	1	0	90	176
Providence, R. I	487	480	18	89	505	569
New Bedford	25	13	27	106	52	119
Mobile	26	37	8	18	34	55
Pensacola	.....	.....	72	106	72	106
Pascagoula	.....	.....	.....	.....	19	15
Brunswick, Ga	.....	.....	.....	.....	20	54
Port Townsend	.....	.....	.....	.....	140	746
Total percentage American						37
Total percentage foreign						63

MANNING.

It is found upon consulting various statistics and reports on the subject, that the proportion of seamen employed to the tonnage has been gradually reduced for many years past in nearly all maritime countries, but especially in vessels sailing under the United States and English flags. It is also found that the American ship-owner is the most economical in this respect.

This reduction has doubtless been justified (in part at least) by the increased size and improved rig of vessels, which enable them to be navigated with lighter crews, and by the labor-saving mechanical appliances brought into service on board our modern ships for the performance of heavy work. It has been considered for some time, however, that the practice of taking light crews has been carried to an unsafe extreme in some American vessels.

Sir Thomas Brassey, in his exhaustive work upon British seamen, introduces a comparison between the actual manning of a British sailing ship of 1,200 tons and what it should be, according to his opinion, which for the sake of further illustration I copy below, with the average crew of an American ship of the same dimensions:

Rank and rating.	Crew of American ship.	Crew of British ship.	Crew as it should be.
Master	1	1	1
First officer	1	1	1
Second officer	1	1	1
Steward	1	1	1
Cook	1	1	1
Boatswain	1	1	1
Carpenter	1	1	1
Engineer	1	1	1
Boys or apprentices	2	2	4
Ordinary seamen	2	2	4
Able seamen	12	14	18
Total	23	26	34

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Let us put this system of manning a vessel into practice by sending the ship to sea. The pilot leaves her outside of Sandy Hook with all sail set and a fair wind; but let us suppose it is during the squally month of March. There is scarce time to set the watches before night comes on. It is the starboard watch on deck. This watch is, under the supposed economical system practiced in our American ships, composed of the following persons, all more or less strangers to each other, with one or two at least full of liquor, and, perhaps, as many more who cannot speak or understand English:

On deck, starboard watch.	Number.	Below, port watch.	Number.
Second officer	1	First officer	1
Boy	1	Boy	1
Ordinary seaman	1	Ordinary seaman	1
Able seamen	6	Able seamen	6
Total	9	Total	9

Here we have a total of nine persons on deck, but only six of these are presumed to go aloft in case of taking in sail, as one is the officer of the deck, and one is at the helm and another stationed forward on the look-out. The weather suddenly becomes threatening and it is necessary to reduce the canvas. The royals are clewed up and furled, but before the last man is down from aloft it is necessary to take in the top-gallant sails. The second mate and a boy manage to clew up the mizzen, while the rest of the watch are dragging away at the fore-top-gallant clew-lines. There is no one at the buntlines, or perhaps the men cannot readily find the right ropes in the darkness, for the belly of the sail slats so heavily that before the second mate can get forward and cant the yard to the wind and direct the watch in getting hold of the right gear, the foot of the sail is cleared of the bolt-rope, and has to be furled in remnants. All this time the main-top-gallant sail, which had been lowered to the cap, is bellying and thrashing in the increasing gale. The captain, who has been called out of his short nap, comes on deck, and after soundly blaming the second mate for his carelessness, orders all hands to be called on deck to shorten sail. The watch below muster out of the forecastle, hardly knowing whether they are dreaming or actually afloat. In passing aft to leeward of the galley, they tread on the slushy waste from the coppers, and the ship making a heavy lurch, they lose their footing and fall together into the lee scuppers. They scramble up as best they can while the officers are lowering away the topsail yards, and singing out to the best of their lungs, "Bear a hand, men! Hurry along to the weather topsail braces! Man the reef-tackles! Let go the buntlines! Clear that kink out of the fore-topsail halyards! Haul down the jib!" &c., &c. Now, be it remembered, that as four hands are still aloft furling the main-top-gallant sail, which was, after much hard pulling and hauling and sundry oaths, clewed up by the watch, there are actually only ten of the entire crew left on deck to perform all these urgent evolutions in a hurry. Meanwhile the captain, who is on the poop, has been crying at the top of his voice for some one to come aft and "Lower the spanker," which job, however, he has to do himself, leaving the sail bellying out over the lee rail and the gear hanging about in danger of encumbering the wheel. In order to ease the strain, for the wind, which has backed in to about south-southwest, is now blowing in heavy squalls, the ship is kept off three points. As if to cap the climax of confusion, a man aloft sings out,

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"Light oh! two points on the lee bow," and the sailor who had been placed on the lookout, evidently a foreigner, with little knowledge of English, comes running aft all out of breath with fear, crying out, "Mein Gott, captain, what for you don't port der helm? der big steamer shall run us just into." But the captain, who has fortunately brought his night-glass to bear on the stranger, makes out her red light and orders the man at the wheel to luff, when in a few minutes a large iron steamship looms up through the rain close alongside, and sweeping past to leeward is soon lost again in the darkness.

Luckily, gales of wind generally come on gradually, allowing sufficient time to hand or reef one sail before another has to be taken care of; but in a squally, dirty southwester, like the one I am describing, the gale sometimes comes "butt-end first," as sailors say, and owing to the undermanning of the ship provides an all-night job for all hands.

In order to make the ship snug for the gale, it is necessary to hand the courses and furl the upper topsails, so that it is lucky if more than one sail is not split and blown away or a yard sprung in consequence of the slowness with which the work must be performed. But everything has an end, even at sea; and when, near daylight, the decks are finally cleared and the welcome order to "Go below, the watch" is heard, the wet and wearied sailors are glad enough to avail themselves of the opportunity of rest. But alas! there is little surety of rest at sea. The gale keeps backing round to the eastward, laying the ship in the trough of the sea, and it becomes necessary to put her head the other way. The men have scarcely stripped themselves of their wet clothes and lain down in their berths, when the cry "All hands to wear ship" is shouted at the forecastle door. Another half hour's hard work is performed, and then seven bells is struck—breakfast time—and the overworked crew, without sleep for twenty-four hours, gather about the kids with good appetites.

Sailors are a happy-go-lucky set, and as soon as one gale is over they good-naturedly get ready for another. But who wonders if at such times of trial they should lose patience? Yet, the severe tax on their energies has been necessary, and they know it, and so they learn to obey orders and do the best they can; and, although seamen have a right to make common complaint in case a ship is to be sent to sea undermanned, they seldom do it, being content to trust to the captain and owners to attend to that.

But the logical deduction to be made in such cases, which are by no means uncommon, is that some of our merchant vessels do go to sea so short-handed as not to afford the ship's company the necessary rest, without which a good watch cannot be kept or a hazardous duty intelligently performed. According to an able commander in the English service, writing for the London Nautical Magazine, "no man can keep alternate watches, even with the usual interruptions, during many consecutive nights without feeling his brain overtaxed and muddled. He may give his bodily presence on deck from 8 p. m. till midnight and from 4 till 8 a. m., and may be perfectly sober and not asleep, but he is not possessed of the same clearness of intellect which he would enjoy provided he had not been called in his watch below."

Although this is a matter little thought of, it is questionable whether its proper consideration might not pay when fitting away a ship.

There is no law at present that interposes between the master of a vessel and his crew in regard to the number he shall carry, and I would not at present recommend the Government by legislation to lay down fixed rules in the matter, especially as the requirements of the different

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rigs and types of vessels are so variable and the different trades in which they are employed demand as many different scales of manning; all of which are best known to the masters and owners, and may, therefore, be left to their judgment. These matters have heretofore been decided with a view to internal economy; and, it seems to me, should be allowed to continue to be simple questions of how the same degree of safety in navigation can be maintained without loss in wear and tear of the vessel, or of time in making a voyage with a minimum expense in the pay-roll.

In marine insurance it is understood that the assured warrant the vessel at the beginning of the voyage to be seaworthy, one of the most important conditions of which term is that she shall be properly equipped and manned with a sufficient crew; but the number and quality of the persons composing the crew are invariably left with the master or owner to decide.

If a majority of a ship's crew, together with the mate, when bound on a foreign voyage, discover, after the voyage has commenced, that the vessel is not properly manned, the master, it is true, may be required to stop at the nearest or most convenient port and have an examination held to decide whether the vessel is fit to proceed on her voyage without additional men; but this privilege is rarely claimed.

In reference to the returns made by the shipping commissioners in various ports of the country, it will be seen that numerous discrepancies exist in the customs of manning vessels of different kinds.

Some of the large fore-and-aft schooners fitted with engines and patent hoisting inventions go with as few as one man to the 100 tons register. The usual proportion, taking the average of all classes of American sea-going vessels, is two and one-half men to the 100 tons register, being one and three-fourths men in sail vessels, and three and one-fourths men in steamers. This, indeed, is the least average manning scale of any maritime nation. The British merchant marine, which is next to ours in its economy of manning, stands two and one-half men per 100 tons register for sail vessels, and three and three-fourths men for steamers.

Notwithstanding the fact that our vessels continue to make comparatively successful and speedy voyages which would prove that they are on an average provided with capable crews, there have been instances of undermanning, and serious casualties have been occasioned in consequence. And it is just this probability of casualty from undermanning that has led me to place my views on record and utter this note of warning, as the effort to save the wages of one or two sailors whose services were really needed on board, would be but a poor excuse confronted with the loss of the vessel, her damage or delay occasioned by want of a full crew to handle her properly.

WAGES.

Closely allied to the subject of manning is that of wages. As a general rule, the rate of wages is higher in the mercantile marine of the United States than in that of any other maritime country. This condition of things imposes a considerable drawback to our ability to compete for the foreign carrying trade, which has to be made up by a superior organization or a greater degree of energy and intelligence on the part of the men themselves.

However, the success which has generally crowned our efforts in striving for a share of the prizes of ocean trade, especially in sailing vessels

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and yachts, seems to prove that our crews, although numerically less, are really superior to those employed in any foreign service. As more than half of the seamen who make up American crews are of foreign birth, it would follow that the best class of foreigners are attracted to American employment by the offer of higher pay or the inducements of better fare. It has been discovered that the price of skilled nautical labor is governed by the same laws that operate upon the labor market on shore, it being better where the pay is higher and difficult to obtain, and inferior in quality where the remuneration is low.

The accommodations provided for crews in different vessels, as well as the fare, provisions, &c., also have their influence upon wages and in procuring a better class of men.

Steamers generally pay more wages than sailing vessels, and thereby are said to obtain better crews, they being mostly composed of men having families, who prefer short voyages on that account. However, it is said that the men who go a long time steadily in steamers are apt to become unsuited to service in sailing ships.

The rate of wages paid the seamen in American ports has always been more fluctuating than that paid abroad, being invariably higher in periods when shipping finds ready employment, or in war time, when the navy makes an unusual draft for seamen. More or less trouble is experienced by foreigners at such seasons in losing their crews in our ports, as their men, induced by the promises of crimps who hold out great inducements, sometimes desert in a body.

The practice of discharging crews and shipping new men in every port, which has to some extent followed the introduction of stevedores or lumpers for handling cargo, is believed to have a pernicious effect upon seamen, as when turned adrift in a foreign port they realize that they have no settled home and imbibe a distaste for the flag. Moreover, being left to their own resources, they look for companions ashore, generally of a low order, with whom to spend their money and pledge a month's pay for board, &c., when they have to seek employment in another vessel, and when the captain is ready to sail again he is obliged to engage strange men, as his own crew is scattered and gone. A ship's cargo is probably unloaded with greater dispatch by the lumpers, but the custom of employing them to the prejudice of the crew is of doubtful economy, to say nothing of its evil consequences to the seamen, who are, as it were, forced into a season of idleness and dissipation.

Besides, all these disadvantages have their influence in dissuading young men and boys from taking up sea life as a business. The lottery of the sea, said Adam Smith, is not altogether so disadvantageous as that of the army, "and the dangers and hair-breadth escapes of a life of adventure, instead of discouraging young people, seem frequently to recommend the trade to them." But if they are sure to be badly treated and can form only evil associations, all well brought up youths will be inclined to choose the profession of a soldier, in case only these two are open to them.

The prospect of advancement in the American merchant marine has, however, always been good, and may still be held out as an inducement to young men to go to sea. Many of our successful shipmasters, and not a few large ship-owners have "come up through the hawse-pipes" to their present honorable positions.

In closing these remarks on the wages of seamen, a table is annexed showing the average rates of wages paid seamen for long voyages at the principal ports in this country and in England during the past

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forty years. The wages paid for short voyages were usually much higher, but have been so fluctuating as to be difficult to estimate.

Periods.	Class.	For long voyages from New York.	For long voyages from London.
From 1845 to 1850	Sail	$12 to $15	£2 1s. to £2 5s.
From 1850 to 1855	...do	14 16	2 10 2 15
From 1855 to 1860	...do	15 20	2 15 2 10
From 1860 to 1865	...do	15 25	2 10 3 10
From 1865 to 1870	...do	15 18	3 00 2 10
From 1865 to 1870	Steam	16 20	2 10 3 10
From 1870 to 1875	Sail	18 20	2 15 3 00
From 1870 to 1875	Steam	18 25	3 00 3 10
From 1875 to 1880	Sail	16 20	3 00 3 05
From 1875 to 1880	Steam	17 22	3 10 3 15
From 1880 to 1885	Sail	15 20	3 00 3 10
From 1880 to 1885	Steam	16 25	3 10 3 15

SHIPMENT OF SEAMEN.

The various measures proposed for the protection of sailors have not all of them been of such a practicable nature as to afford beneficial results, as, for example, the "prohibition of advance wages." The evils of the advance system were notorious, and led to so many abuses that there was a general demand for legislation on the subject. It was thought that if the practice of accepting advance notes upon the sailors signing the shipping articles could be abolished it would be of great advantage to both ship-owners and seamen. It was said that the money thus obtained (in nine cases out of ten) was only spent in debauchery, and in sowing the seeds of future disease.

In response to the efforts of persons who had shown themselves true friends of the sailor, a section was incorporated in the act of June 26, 1884, making it unlawful to pay advance to seamen shipped in the ports of the United States. The section in question reads as follows:

Advance wages not to be paid to seamen.—Assignment to pay to wife or mother.

SEC. 10. That it shall be, and is hereby, made unlawful in any case to pay any seaman wages before leaving the port at which such seaman may be engaged in advance of the time when he has actually earned the same, or to pay such advance wages to any other person, or to pay any person, other than an officer authorized by act of Congress to collect fees for such service, any remuneration for the shipment of seamen. Any person paying such advance wages or such remuneration shall be deemed guilty of a misdemeanor, and, upon conviction, shall be punished by a fine not less than four times the amount of the wages so advanced or remuneration so paid, and may be also imprisoned for a period not exceeding six months, at the discretion of the court. The payment of such advance wages or remuneration shall in no case, except as herein provided, absolve the vessel, or the master or owner thereof, from full payment of wages after the same shall have been actually earned, and shall be no defense to a libel, suit, or action for the recovery of such wages: *Provided*, That this section shall not apply to whaling vessels: *And provided further*, That it shall be lawful for any seaman to stipulate in his shipping agreement for an allotment of any portion of the wages which he may earn to his wife, mother, or other relative, but to no other person or corporation. And any person who shall falsely claim such relationship to any seaman in order to obtain wages so allotted shall, for every such offense, be punishable by a fine of not exceeding five hundred dollars, or imprisonment not exceeding six months, at the discretion of the court. This section shall apply as well to foreign vessels as to vessels of the United States; and any foreign vessel the master, owner, consignee, or agent of which has violated this section, or induced or connived at its violation, shall be refused a clearance from any port of the United States.

This law continued on the statute-book without amendment for a period of two years, resulting in no apparent benefit to the class it was

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designed to protect. While some of the more steady men who could and would under any circumstances protect themselves were in good faith glad to avail themselves of its privileges, the large majority were willing to be duped by the crimps, and in many instances gave aid and comfort to the enemy in evading the spirit of the statute. The different methods practiced in getting around this particular section were referred to in my last year's report. Probably the most common one, called the English plan, because it is the one usually practiced in British ports in order to evade a similar law there, is a "gratuity note," which is given the sailor or landlord for the part of the wages which does not appear on the shipping articles. For example, wages being $20 per month, the men ship for $1 for the first month and $20 for each subsequent month, a note for $19 being given to square the deficiency.

Another plan is for seamen to sign for less wages, say one-half the rate being paid at the port. For instance, the wages paid for going to Liverpool being $20 per month, the practice has been to give a month's advance, when the men sign for $10 per month, the understanding being that an equal amount shall be paid to some landlord for the time the men are actually employed.

In some cases, where the regular wages without advance has been entered on the shipping articles, it has been found that the landlords have received money in the form of bonuses.

The following statement, made by the crew of an American ship at Liverpool from San Francisco, shows one of the methods resorted to at the latter port in order to nullify the law:

We, the undersigned seamen of the American ship H. B. Hyde, before signing in the said ship at San Francisco, were given to understand that the laws of America did not allow any advance. If we would ship for less wages we would receive a bonus. The wages at that time were $22.50 per month, equal to £4 10*s*. We signed for $15, equal to £3 per month, and were to receive a bonus of $30, equal to £6, being £1 10*s*. per month of our proper wages, allowing four months for the passage home.

Fourteen of us, seamen, were living at the Sailors' Home in San Francisco, and when we signed articles the commissioner gave us distinctly to understand that we had no advance, and our wages would commence as soon as we joined the ship. We then went to the Sailors' Home to settle our accounts, and were then asked to sign the book. We were all anxious to know what this was for, and were informed that it had to go before the committee of ladies to show them that we had been properly settled with. We then sailed for Liverpool in the said ship, and during the voyage the captain allowed us to take as much tobacco and clothes as we liked, and after a quick passage of ninety-four days we arrived in Liverpool. When the time came for payment of wages the captain engaged one of the American shipping agents to make up our accounts and pay us off before one of the consul's clerks. Instead of commencing with the first on the list he took the last. He inquired his name, and stated he was such a time in the ship at so much per month, had clothes and tobacco, which being deducted left him $30, equal to £6. The seaman was asked to sign clear, which he accordingly did, thinking he would then receive the amount due. However, to his surprise, the captain took out of a drawer a bill which he alleged the seaman in question had signed at the Sailors' Home in San Francisco with $3 added to it, and which he (the captain) had paid, and which sum of $33 being deducted from the wages due, left the seaman $3 in debt to the ship. As soon as we found that nothing was to be paid, we all refused to sign clear unless we received the amount due to us. We then went before the American consul and stated our case. When the captain was called some of us were asked as to our alleged signatures on the bills, and we all said it was a book we signed and nothing else. It seems that these bills had been torn out of the book, taken to some notary public (whom we never saw), and sworn to by some runner, and sealed with the usual stamp. This was all done without our knowledge. When we told the consul all the facts of the case in the presence of the captain the latter thought proper to deny the same, using somewhat unparliamentary language. Ultimately, we were compelled to apply to a solicitor, and when everything was ready for going into court we were all notified that the consul had stated that he had power to take it out of any court and try it himself. Our solicitor allowed matters to come before the consul in the usual form, and after a considerable time our legal agent was informed that he could not give a decision, and would forward all particulars to the legal representatives of the American Government at

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Washington, but he would direct, in the meantime, payment to seamen who had anything to take (under protest), the balance claimed to be kept for final adjudication.

Strange to say that many of us have stopped at the Sailors' Home before, and shipped in the same way for other ports in England, and properly settled with, but we have found it different in Liverpool. Such are the facts of the case. The matter will soon be in the hands of the legal representative of the American Government, who will, no doubt, make strict inquiry into all the facts of the case, and the proceedings in the Sailors' Home at San Francisco, and how the alleged bills came into the captain's hands. We have not the slightest doubt what the decision will be. What we have stated are facts pure and simple. Before concluding we must express to Mr. Steinforth, solicitor, our heartfelt gratitude for his great efforts on our behalf for a proper settlement, and hope he will continue the same until a final adjudication is made.

Signed—Wilson Duncan, S. Shannon, F. G. Butler, George Kanchlin, Olaf Olsen, Bernard Harris, William Mackay, Frank Larson, John Taylor, Antonio Frizrerro, George Brodin, Frank Hatt, William Davies, P. Rutyki.

LIVERPOOL, *April*, 1886.

Some severe criticism has been made upon the conduct of parties having charge of the Sailors' Home at San Francisco in connection with the above case.

This institution is carried on in a building once the United States Marine Hospital (which, being in a dilapidated condition, was given to the city of San Francisco by the United States for the purpose of establishing a Sailors' Home) by a society of ladies, but the officers should be careful that no such fraudulent transaction as that alleged should occur under a roof presumed to be devoted to benevolent purposes.

But, however the affair of the H. B. Hyde may be viewed by some persons, it appears only to be another way of willfully defeating the law. If we credit the statement of the seamen, they were duped into signing a book at the Sailors' Home to show their settlement with the ladies' committee, but they really signed a promissory note for advance wages the seamen never received, and which was charged against them on the day of the final settlement. On the other hand it may be said that the master, having paid $210 cash for their account, although contrary to law, would be bound in justice to the owners to collect it of the men at the end of the voyage or to make it good out of his own pocket. In either case it would operate as a hardship upon the seamen as well as the master or owner.

The case was submitted to the Government, and in closing his letter asking for instruction of the State Department, the United States consul at Liverpool remarked that if the Department ruled that the master could not stop the amount of the notes in question (obtained in that questionable manner) it would entail a loss of from $24,000 to $25,000 to American ships bound to that port, there being seven hundred seamen belonging to the fleet on the way, many of whom were undoubtedly shipped in the same manner. The consul closes his letter with the remark, "I may add that my experience here has convinced me of the necessity of a change in the Dingley act of June 26, 1884, as it is urged by the Commissioner of Navigation in his last report (1885)."

ADVANCES AND ALLOTMENTS.

By the act of June 19, 1886, the law of June 26, 1884, was amended or modified by the following section:

Advance wages to seamen.

SEC. 3. That section 10 of the act entitled "An act to remove certain burdens on the American merchant marine and encourage the American foreign carrying trade, and for other purposes," approved June 26, 1884, be amended by striking out the words

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"That it shall be lawful for any seaman to stipulate in his shipping agreement for an allotment of any portion of the wages which he may earn to his wife, mother, or other relative, but to no other person or corporation," and inserting in lieu thereof the following: "That it shall be lawful for any seaman to stipulate in his shipping agreement for an allotment of all or any portion of the wages which he may earn to his wife, mother, or other relative, or to an original creditor in liquidation of any just debt for board or clothing which he may have contracted prior to engagement, not exceeding $10 per month for each month of the time usually required for the voyage for which the seaman has shipped, under such regulations as the Secretary of the Treasury may prescribe, but no allotment to any other person or corporation shall be lawful." And said section 10 is further amended by striking out all of the last paragraph, after the words "vessels of the United States," and inserting in lieu of such words stricken out the following: "And any master, owner, consignee, or agent of any foreign vessel who has violated this section shall be liable to the same penalty that the master, owner, or agent of a vessel of the United States would be for a similar violation."

Under the provision of the law cited the Department was authorized to make a schedule of allotments (which now take the place of advances) for the different voyages, and the subjoined table has been adopted, the amount published being the limit to which money can be alloted from the wages of seamen shipping in the ports of the United States for voyages mentioned.

Schedule of voyages for sailing vessels.

[For steam vessels on foreign voyages the allotment may be one-half of the amount allowed sailing vessels.]

Number of months.	Allotments or advances not to exceed—	Voyage.
½	$5 00	Coasting voyages, except between the Atlantic and Pacific ports, including voyages from first coasting district to Atlantic ports in the Dominion of Canada.
1	10 00	Voyages between ports in second and third coasting districts to Atlantic ports in the Dominion of Canada.
3½	35 00	Between ports on Pacific and Atlantic coasts.
½	5 00	Between Pacific ports and British Columbia.
1½	12 00	Between ports in first and third coasting districts and ports in Europe.
1½	15 00	Between ports in first and third coasting districts and ports on the Mediterranean east of Sicily and Black Sea.
2	20 00	Between ports in second coasting district and ports in Europe.
4	40 00	Between ports on Pacific coast and ports in Europe.
1½	15 00	Between ports on Pacific coast and ports in Sandwich Isles.
2½	20 00	Between ports on Pacific coast and ports in New Zealand, Tahiti, Australia, &c.
3	30 00	Between ports on Pacific coast and ports in China, Philippine Isles, Java, &c.
3½	35 00	Between ports on Pacific ocast and Mauritius, Calcutta, and Bombay.
1½	15 00	Between ports on Atlantic or Gulf coasts and North and West African ports down to and including Cape of Good Hope and adjacent islands.
1½	12 00	Between ports on Atlantic or Gulf coasts and West Indies and Central America.
3	30 00	Between ports on Atlantic or Gulf coasts and east coast of Africa, Mauritius, and Madagascar.
3½	35 00	Between ports on Atlantic or Gulf coasts and East Indies, including Singapore and Java.
4	40 00	Between ports on Atlantic or Gulf coasts and China and Japan and Philippine Isles.
3	30 00	Between ports on Atlantic or Gulf coasts and Australia and New Zealand.
3	30 00	Between ports on Atlantic or Gulf coasts and ports on east coast of South America.
3½	35 00	Between ports on Atlantic or Gulf coasts and ports on west coast of South America, Central America, and Mexico.
1	10 00	Between ports in first and third coasting districts and Mexico.
½	5 00	Between ports in second coasting district and Mexico.

NOTE.—Allotments to original creditors, under section 3 of the act, on account of food or clothing owed for by the seaman at the time of his engagement, cannot be made to exceed $10 per month for the time usually required for the voyage for which he has shipped. The allotment must be specified in the shipping agreement, the amount thereof per month and the number of months for which it is to be paid being expressly stipulated. To render such allotments uniform, it is directed that they shall not be allowed for periods exceeding those mentioned in the above schedule, respectively.

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The table or schedule which specifies the limit of advance in allotments is arranged in reference to the estimated average time occupied by a sailing vessel in making a voyage to the port of destination stipulated in the shipping articles. It is not presumed that the phraseology of the section "*not exceeding ten dollars per month for each month of the time usually required for the voyage for which the seaman has shipped*" was intended to include the homeward voyage, as under such an interpretation for a twelve months' voyage around the allotments would in some cases amount to the large sum of $120 for each seaman. In cases where a limit of time of service is stipulated on the articles, the first place or port of destination should be stated in the articles, and the amount named in the schedule applied to that place in regulating the advance allotted.

There is some doubt as to the legality of articles drawn out for a term of time, some courts in this country and in England having held such contracts to be void when the phraseology was not plain. But it is equally the case that the majority of the articles of agreement made out for long voyages, and executed at the public shipping offices at the large ports, are worded in this identically vague manner, and it is difficult to see on what equitable grounds the courts of law have decided such agreements to be illegal. The sailor should know perfectly well what he signs, and if not competent, he should be advised at the time of shipment how to care for his own interests; and as there is nothing immoral in such contracts, it ought to be perfectly legal for him and the master to enter into a mutual engagement for a voyage to any part of the world, wherever freight may offer, for a specified duration of time. The fact remains that, notwithstanding the adverse decision of the courts, such engagements continued to be frequently entered into. Some doubt, however, attached to the question until the act of June 26, 1884, was adopted and legalized the proceeding.

Section 19 of that law especially provides for the shipment of seamen for stated periods, and not only enacts that the seamen may be shipped to go abroad under such contracts, but that masters making regular trips between the United States and a foreign country may engage a seaman for one or more round trips, or for a definite time, and on return of said vessel to the United States may reship such seamen for another voyage in the same vessel without payment of additional fees for each reshipment.

In ports where the law prohibiting advance wages to seamen has been observed and the plan has been found to work well there need be no change under the new law, and it is hoped that in many cases seamen will continue to make no allotment, or at least only for a part of the amount allowed. Although well aware of the evils attending the system of advance notes, I foresaw how difficult it would be to get rid of them entirely, and the failure which has attended our efforts to do so, with the still more complete failure of the British authorities to enforce the English law in their ports where seamen are more plenty, show how hopeless it is to try to frame a law upon the subject that cannot be evaded. It is thought, however, that under the new plan of limiting the amount payable to the seamen's creditor to a fixed sum to be allotted monthly according to the length of the voyage, the reasonableness of the proposition will recommend itself to both landlord and seaman. The seaman on the one hand is allowed a portion of his pay sufficient, it is thought, to liquidate any reasonable debt accrued prior to shipment, while on the other hand the landlord is prevented from taking an undue share of the sailor's pay before he earns it, and cannot charge the ship-owner bonuses

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and blood-money, according to the practice under the old system. It is thought that the law will be enforced and the established rates of allotments be accepted in good faith in lieu of advances, and after the system gets into good working order it is believed that the friends of seamen, and those engaged in the sailor's reformation, will perceive it to be the only practicable way of rectifying the evils incident to the shipment of seamen.

It is said of most sailors that if an advance were paid into their hands or if they could cash their allotment notes, they would not pay their honest debts or buy clothes or any outfit with the money, but spend it in drink, and perhaps fail to go on board ship at the appointed time. Although this is the case with some, there are many seamen actual residents of the United States, especially those who have families depending on them for support, to whom it would be an act of justice to allow a portion of their wages in advance or in allotments, and it is more particularly for the relief of this steady and reliable class that the present allotment system was designed. But I earnestly recommend to seamen, however destitute they may be when shipped, to take as small a portion of their wages in allotments as possible, not more than one month's installment, sufficient to pay any just debt or provide any necessity for the voyage, and to rely mainly upon the ship's slop-chest for their outfit. They will then have a prospect ahead and something to look for at the end of the voyage. It must be plain to any one that upon the completion of a long cruise a seaman under such circumstances must have a considerable amount of wages due him, the slops furnished to him by the master amounting to but a comparatively small portion of his earnings, and he would have on shipping again money to buy the necessary clothing, tobacco, &c., for another voyage, and probably after these purchases, if he is economical and thrifty, sufficient left to amuse himself in some recreation before joining his ship. In this way he will need no allotment, and, unless he has a family to leave it with, will take none. Some thrifty, economical seamen in this way so husband their resources as to carry money on board to deposit with the master, to spend at the next port, without drawing from their wages. But, as might be expected, such men do not stay long "before the mast;" they are likely to be selected at any time for officers, and if steady and faithful, generally rise to the top round of the ladder in the merchant service.

PHYSICAL EXAMINATION AND HEALTH.

With regard to physical examination of seamen, any master may, under our present law, have the aid of a physician of the Marine-Hospital Service to examine his men free of cost to the ship, and I think this privilege should be generally availed of, as the safety of the ship and all on board might depend upon it. It would be proper for every man at the time of shipment, or before going to sea, to be tested as to color-blindness by a thorough and searching trial of his powers of sight in a dark room with the different colored lights flashed suddenly before him, as they are sometimes in thick weather or in a storm at sea.

An examination as to the actual physical condition of seamen and their ability to perform the arduous duties required of them as able seamen is also very important, as it is thought by passing through such a process a certain proportion of diseased men would be eliminated. In the course of successive long voyages many men become unfit for further service through no fault of their own, but because, by living for years so constantly upon salt provisions, their blood has finally got into

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a condition of incipient scurvy, and although they may not show signs of actual disease at the time, the ship scarcely gets to sea before the debilitating complaint develops itself. Medical authorities state that the chief, if not the only, cause of scurvy is a prolonged deprivation of fresh vegetables. A plentiful use of lime-juice or lemonade, if not a remedy, is considered to be a preventive, but in cases where the seeds of the disease have been previously planted in ships, where none of these antidotes were dealt out upon long tropical voyages, there is no sure safeguard, and such men should be considered as in an unfit condition to sign articles for a long voyage. It has been stated by a high authority that in the British marine 40 per cent. of the sickness among seamen afloat is occasioned by scurvy.

The following suggestions are made in connection with the provision scale for seamen, which it is desirable to improve in certain particulars:

(1) That while the ship is in port fresh meat from the market be substituted for salt provisions. That not less than 1 pound per day of fresh vegetables, such as potatoes, greens, radishes, water-cresses, &c., with fruits of various kinds, form each seaman's food while in port. Water-cresses are said to act as a powerful antiscorbutic, as also potatoes.

(2) That vessels fitting for long voyages take an extra supply of the above vegetables, either fresh or preserved in their juices. Preserved potatoes are considered to be an excellent substitute for the real article.

(3) That canned or preserved meats be provided, so that less of salt provisions than is commonly used may be dealt out to the men, the canned provisions and vegetables being substituted. Salt beef that has been two years in pickle should be condemned.

(4) That the allowance of water be increased when practicable while within the tropics, and that an extra quantity be allowed for washing purposes once per week.

As a further means of prevention against sea scurvy the following is recommended:

(1) Every ship on a long voyage should be supplied with a proper quantity of *lime* or *lemon juice*.

The juice having been received in bulk from the vendors should be examined and analyzed by a competent medical officer. All measures adopted for its preservation are worthless unless it be clearly ascertained that a pure article has been supplied.

Ten per cent. of brandy or of rum should afterwards be added to it.

It should be packed in jars or bottles, each containing 1 gallon or less, covered with a layer of oil, and closely packed and sealed.

Each man should have at least 4 ounces (eight tablespoonfuls) a week, and should take it as part of his daily food. The quantity should be increased to an ounce daily if any symptoms of scurvy manifest themselves.

The giving out of lime or lemon juice should be commenced with the issue of salt provisions, and should be continued even with fresh meat in harbor when no green or succulent vegetables accompany it. It should certainly not be delayed longer than a fortnight after the vessel has put to sea.

(2) *Preserved vegetables.* Of these potatoes and onions are the best; next, greens, carrots, turnips, &c.

(3) A *plentiful* supply of *good water*.

(4) Attention to *cleanliness* and *ventilation*, more particularly of the quarters of the crew.

A careful inquiry as to the seaman's antecedent course of life, seems necessary, especially before shipping for a long voyage, as a sailor who has been on a number of consecutive tropical voyages is quite likely to be a more proper subject for the wards of a hospital than for a ship's deck; and the interests of the crews themselves, as well as those of the

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owners and underwriters of vessels and cargo, would be better protected by such inquiry.

After the men are once on board it seems to be quite as desirable for the protection of the same interests that they be made as comfortable as their narrow quarters and the trying duties by night and by day and in storm and in shine which they are called upon to perform will permit. I am convinced that ship owners and masters would find it to their permanent advantage to encourage their men instead of abusing them for every little remissness in the line of duty, and so to mitigate some of those inevitable hardships they are called upon to bear. This may be done in many ways at a trifling cost, and would be found to add much to their ability as well as willingness to do their best in a hard time, when a good will with strong arms is necessary. I need hardly speak of the importance of good food, for in that matter our American ships stand first, but still there are cases when the "stores" and water have justly been complained of; but there is a great difference on this point in our vessels. In some large ships many inexpensive extras, such as tables and dishes, are furnished for the use of the crew.

It has been said that the saving in provisions by such an arrangement is considerable. Let every vessel over 600 tons have a room set apart near the forecastle for a mess-room for the crew, to be cared for by one of their number or by the cook, and let the sailors be made to take their meals like other people. This will naturally be distasteful at first to the ordinary old salt, but after becoming accustomed to sit at a table and take his meals he will be found to have no objection to the improved method.

There is in fact a growing disposition to increase the comforts and enjoyments of seamen while at sea. Some vessels are now furnished with a library of interesting books for the entertainment and instruction of the men during their voyages. No class has a better opportunity to increase their information by study and reading than sailors upon long voyages, and it is a pity, where young men are inclined to study, they should not have the opportunity of improving their leisure time in that way.

OUR SEAMEN WHEN ABROAD.

The United States law prohibiting payment of advance wages cannot be enforced in the shipment of crews for American vessels in foreign ports. The principle governing the shipment of men in the home ports should, however, be observed as far as practicable by our consular officers. If men sailing from our ports without advances are paid off abroad they ought to have money enough due them to last until they find another ship, and for such seamen to receive an advance on their homeward voyage would have the effect to take nearly all their earnings on voyages to foreign countries and leave them well nigh penniless on their return to this country. It would be well, therefore, for the United States consuls to recognize the spirit of the law by throwing the weight of their influence against the payment of wages in advance, except in some special cases like the following, viz:

(1) Destitute seamen who have been wrecked, stranded, cast away, picked up at sea, and American seamen who come upon a consulate in a destitute condition, for relief, otherwise than in the employment of American vessels.

(2) Seamen whose wages, regular and extra, or either, by reason of long-continued illness, or the failure to find employment without their fault, have been expended, according to law, by the consul.

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It is provided by the law that when the round voyage of a vessel is subdivided into different cruises, the seaman on arrival in the foreign port shall be entitled to receive one-third of the wages due him, but no more, and of course it is expected that the consul shall be guided by this provision, but it is found in many instances to be impracticable to carry out the rule, for the reason that very nearly all seamen serving on American vessels received fully, in the shape of advances, bonuses, or allotments, more than one-third the wages he can earn in any trans-Atlantic voyage. Even in voyages to India, which may be safely estimated at one hundred and twenty days, an allotment to the original creditor of four months' pay at $10 would render the provision of law inapplicable if the seamen have been supplied to any extent with clothing, &c., from the slop-chest. Nearly every sailor uses tobacco, which adds to the debt he runs up during a voyage.

Many American ships load coal, &c., in England for East India ports and other long voyages. There being no limit to the advance paid in such cases, £3 sterling per month is the average wages for all grades, and the practice is to allow two months' advance. Now, if we add £5 for slops and tobacco during the voyage to the £6 paid in advance, we have £11, lacking only £1, of the whole four months' wages. The result exhibits the evil of the advance system, and shows that the practice of allowing large sums in advance should be resisted as much as possible abroad, and the spirit of the allotment provision be carried out in foreign ports. As the law requires a shipmaster to carry clothes for destitute or insufficiently clad seamen, it becomes at once evident that it is not the master who is to blame if the seaman has received nearly all, if not all, the wages due him on arrival at his port of destination.

Moreover, it will be seen that if a seaman dies, or the ship is wrecked or lost on the voyage before he earns the advances of money and slops, the unearned balance is a dead loss to the owners and master, and also when a seaman deserts before he has earned what he owes the ship, and in the latter case the expenses incurred in an endeavor to arrest him and shipping another man in his place, &c., have to be added to the loss mentioned.

And in case a crew is discharged, as in the event of wrecking or stranding, and they have no arrears of wages, or little due them by reason of heavy advances on shipping, their relief has to come out of the United States "destitute-seaman's fund." There is no other alternative to meet the case.

Some cases have come up where ships have been lost and the crew saved and taken to a foreign port, and having wages due them the consul has insisted on their payment before their return home. In such cases, although it is customary to do so, there is no law to compel the ship-owner to send money abroad at great expense for such a purpose. The law recognizes all seamen in such cases as destitute and wrecked seamen of the United States, and they would be entitled to be sent home in the usual way by the consul whether paid or not paid abroad.

The following sections of the act of June 26, 1884, provide for the discharge and payment of seamen in foreign ports under certain circumstances, as follows:

Discharge of seamen by consular officer.

SEC. 2. That section forty-five hundred and eighty of the Revised Statutes be amended so as to read as follows:

"SEC. 4580. Upon the application of the master of any vessel to a consular officer to discharge a seaman, or upon the application of any seaman for his own discharge,

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if it appears to such officer that said seaman has completed his shipping agreement, or is entitled to his discharge under any act of Congress or according to the general principles or usages of maritime law as recognized in the United States, such officer shall discharge said seaman, and require from the master of said vessel, before such discharge shall be made, payment of the wages which may then be due said seaman; but no payment of extra wages shall be required by any consular officer upon such discharge of any seaman except as provided in this act."

Extra wages on discharge in foreign port.

SEC. 3. That section forty-five hundred and eighty-three of the Revised Statutes be amended so as to read as follows:

"SEC. 4583. Whenever on the discharge of a seaman in a foreign country, on his complaint that the voyage is continued contrary to agreement, the consular officer shall be satisfied that such voyage has been designedly and unnecessarily prolonged in violation of the articles of shipment, or whenever a seaman is discharged by a consular officer in consequence of any hurt or injury received in the service of the vessel, such consular officer shall require the payment by the master of one month's wages for such seaman over and above the wages due at the time of discharge."

Discharge of crew in foreign port.

SEC. 5. That section forty-five hundred and eighty-two of the Revised Statutes be amended so as to read as follows:

"SEC. 4582. Whenever a vessel of the United States, is sold in a foreign country, and her company discharged, it shall be the duty of the master to produce to the consular officer the certified list of his ship's company, and also the shipping articles, and to pay to said consular officer for every seaman so discharged one month's wages over and above the wages which may then be due to such seaman; but in case the master of the vessel so sold shall, with the assent of said seaman, provide him with adequate employment on board some other vessel bound to the port at which he was originally shipped, or to such other port as may be agreed upon by him, then no payment of extra wages shall be required."

The above sections embody the provisions respecting the repeal of the old law requiring three months' extra wages to be paid on the discharge of seamen in a foreign port. The new law has now been in operation over two years, and appears to work to the benefit of all concerned. No cases of injustice to seamen have been reported, and I think they are protected in all their just rights, and the ship-owner is no longer made to suffer as before.

DESERTION.

Desertion among the seamen of our service is not uncommon, but it is mostly confined to the foreign portion of the crews, the percentage of native American seamen who leave their ships in foreign ports being comparatively small.

The average wages of seamen in the United States being higher than in most foreign ports, there is, as a rule, no pecuniary inducement for men to desert an American ship while on a voyage.

Statistics prepared some years ago by the British Government go to prove that seamen in the British service only desert in large numbers in those countries where the scale of wages is unusually high. I may state, however, that some sailors, regardless of the contract they are bound to carry out, or however well they have been treated, will desert when and wherever they get the chance, and this upon the most paltry pretenses. Often, without having any complaints whatever against their officers, they desert because they dislike shipmates, generally of a different nationality or color; and, again, when they know themselves to be in debt to the ship. A kind of reckless desire for change and excitement seems to govern the action of most sailors in this respect, and

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although they may complain of the hard work or hard fare, they scarcely ever better themselves by the change.

Section 6 of the act of June 26, 1884, provides for the assistance of United States consuls in case of deserters as follows:

It shall be the duty of consular officers to reclaim deserters and discountenance insubordination by every means within their power, and where the local authorities can be usefully employed for that purpose, to lend their aid and use their exertions to that end in the most effectual manner. In all cases where deserters are apprehended the consular officer shall inquire into the facts; and if he is satisfied that the desertion was caused by unusual or cruel treatment, he shall discharge the seaman, and require the master of the vessel from which such seamen is discharged to pay one month's wages over and above the wages then due; and the officer discharging such seamen shall enter upon the crew-list and shipping articles the cause of discharge, and the particulars in which the cruelty or unusual treatment consisted, and the facts as to his discharge or re-engagement, as the case may be, and subscribe his name thereto officially.

The act of June 26, 1884 (see Sec. 19, below), makes it lawful to ship or "engage seamen at any port in the United States in the manner provided for by law to serve on a voyage to any port," and it has been suggested that ships bound to foreign ports stipulate in the articles of agreement for an outward voyage only. The men so shipped could leave the vessel in the foreign port and there would be no violation of contract or charge of desertion. This privilege is already being availed of with advantage in certain trades.

Crew bond.—Section 4536 of the Revised Statutes provides that the master of every vessel bound on a foreign voyage, or engaged in the whale fishery shall enter into a bond in the sum of $400 that he shall exhibit the certified copies of the crew-list to the first boarding officer at the first port in the United States at which he shall arrive on his return, and also produce the persons therein named to the boarding officer, but such bond not to be forfeited by the master not producing to the first boarding officer any of the persons contained in the list, who may be discharged in a foreign country with consent of the consular officer there residing, in writing, under his hand and official seal, nor on account of any such person dying, or absconding, or being forcibly impressed into other service, of which satisfactory proof shall be then also exhibited.

This provision has been modified in certain cases by sections 19 and 20 of the act of June 26, 1884, which read as follows:

Shipment of seamen for stated periods.

SEC. 19. That a master of a vessel in the foreign trade may engage a seaman at any port in the United States, in the manner provided for by law, to serve on a voyage to any port, or for the round trip from and to the port of departure, or for a definite time, whatever the destination. The master of a vessel making regular and stated trips between the United States and a foreign country may engage a seaman for one or more round trips or for a definite time, or on the return of said vessel to the United States may reship such seaman for another voyage in the same vessel, in the manner provided by law, without the payment of additional fees to any officer for such reshipment or re-engagement.

Shipment of seamen for stated periods at foreign ports.

SEC. 20. That every master of a vessel in the foreign trade may engage any seaman at any port out of the United States, in the manner provided by law, to serve for one or more round trips from and to the port of departure, or for a definite time, whatever the destination; and the master of a vessel clearing from a port of the United States with one or more seamen engaged in a foreign port as herein provided shall not be required to reship in a port of the United States the seamen so engaged, or to

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give bond, as required by section forty-five hundred and seventy-six of the Revised Statutes, to produce said seamen before a boarding officer on the return of said vessel to the United States.

In this privilege to ship men to be discharged abroad, and the modification of the statute in certain cases by the section last cited, it has been doubted whether the crew bond is of any further practicable utility. Is is, however, of use in tracing the men, and when applied to a native American seaman, may be considered to be a form that is demanded in justice to them.

DISCHARGE OF SEAMEN.

The need of a sailor for protection is most frequently at the time of his discharge at the end of a voyage, when he is to receive a sum of money more or less considerable, which is in many cases disposed of in a few days or weeks at the port of arrival, and he is for a short season the object of many attentions from designing persons.

There is a statute (section 4529, Revised Statutes) which prescribes that immediately on the discharge of any seaman after the termination of his agreement he shall be entitled to receive a sum equal to one-fourth the balance due him. As the seaman cannot claim a full settlement until five days after his discharge, or until the cargo has been delivered, this proviso was doubtless intended to render the sailor more independent in the selection of his boarding-house by furnishing him with a part of his wages in cash; but it is said that the law is scarcely ever observed.

It is suggested that masters of vessels carry out the law in this respect by calling the crew aft and paying them a fourth of the wages due them before the final settlement made at the shipping commissioner's office. The seamen would not then be so entirely dependent as they are upon their landlords for providing them with shelter and food during the interval of final settlement, and they will be able to select their own lodgings, having means on hand.

When the final settlement is made before the shipping commissioner, he should avail himself of the opportunity to advise the seamen with a view to his protection as to the boarding-houses in port, or the benefits of the sailor's home, if there be one, while he is in possession of his wages, and before he has been brought in contact with the runners for disreputable places.

LANDLORDS AND CRIMPS.

Sailors' landlords are admitted to be a necessary class, but not so with the sailor runners, or crimps, as they are called in England, who are a kind of middlemen between the sailor and the landlord. In case of inward-bound ships they act as agents for the landlords in bringing the men to the boarding-houses; and for outward-bound vessels they act as agents of the sailors themselves by procuring them situations, or of the master in bringing the crews on board. But there is not any real need of such agents at any of our seaports for either masters or seamen, for when he lands the sailor would himself find more respectable lodgings without the runner's aid, and when in want of employment he can go to the shipping office and select his own ship.

It may be said in their behalf that the crimps are serviceable in mustering the men and so save trouble and expense to the ship-owner; but when it is considered that they exist only through what they get out of the sailors' hard earnings, they may justly be treated as a nuisance

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—intolerable hangers-on, who, in connection with disreputable women, encourage and profit by the vices and debaucheries of the lowest class of seamen. But in order to ply his vocation with success in respect to inward-bound vessels, the crimp must manage to get on board before the men are discharged or paid off, and when he is able to do so he is almost sure to demoralize many of the crew through drink and the encouraging prospect of a good time ashore. His advice to Jack, when he has any money coming to him, is always the same: "Get out of the 'bloody hooker' (slang name for a rotten ship) as soon as possible, and come with me. I will take you where there are mountains of sugar and rivers of rum which is being dealt out by mermaids." Of course this sort of cheap talk does not suit all kinds of men, for sometimes the majority of a crew are temperate, or at least can understand the meaning of such demonstrations; but the crimp knows his business, and for such men he has a different method, though they try to avoid him and go to the Sailors' Home, or to some place of their own selection. But if a crimp can by hook or crook manage to get hold of the kit of a sailor, although consisting only of a canvas bag with a few half-worn clothes from the slop-chest, he is pretty sure of his man. The compensation, in case he succeeds, is ample to pay the crimp for the little trouble he has taken, for the sailor's entire earnings for a voyage have been known to disappear in a single night. The system is by no means confined to this country, and the efforts of the reformers of seamen in various parts of the world have for some years been directed against it. The law in England now steps in to stop the business of the crimp, and a great reformation has already been effected there, but in some French ports as soon as a vessel arrives between the pier-heads, she is assailed by a crowd of boats carrying tradesmen and boarding-house keepers, by whom, too frequently, liquor is handed up to the men, and the navigation of the ship impeded. This practice has been stopped to some extent, but the temptation to which the men were subsequently exposed still continues. The French law punishes the deserter, but takes no notice of the man who incites the sailor to desert, and who is by far the greater culprit of the two. It is even said that in France crimping (*l'embouchage*) in the eyes of the law is not an offense.

In United States ports the operations of the sailor-runner have been seriously interfered with by the law prohibiting advance notes. Their only chance to make the business pay now is in dealing with inward-bound ships, and, I think, by the passage of an act similar to the annexed form, prohibiting their going on board vessels on arrival, the evil influence on sailors of this bad class of men might be checked, if not entirely stopped.

The following remarks upon the subject of crimping, as practiced upon British ships in this country, are from a late report of Mr. Thomas Gray, of the British Board of Trade. It may be taken as an example of the evils of the system suffered abroad by our ships.

CRIMPING ABROAD.

The causes of crimping abroad are the same as those in the United Kingdom (Great Britain)—improvidence on the part of seamen, and skill to take advantage of it on the part of the crimps, but the evils abroad run much higher. Certain ports, like Shanghai, Callao, San Francisco, New York, and New Orleans, have acquired in the past a most evil notoriety. It is to be hoped that the worst brutalities of former days, when crimps used to keep men imprisoned in their houses, and put them on board ship at night, not only drunk, but drugged and insensible (sometimes, it is said, actually dead) are past. But matters are bad enough now in some ports, especially in the United States.

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It is said that crimps in many ports have so much political power that the authorities do not dare to thoroughly put them down, and they work more or less in corrupt concert with the port authorities and the magistrates. Although we have extended our laws for the repression of crimping to the United States ships here, on the understanding that British ships on arriving in United States ports will be equally protected, we have reason to believe that the crews to British ships are still left a prey to crimps, who are allowed to "have a chance," or in other words, to come on board as soon as the vessel reaches port. The United States Government has, no doubt, not been entirely passive in the matter, for they have appointed commissioners to look after these things, and some years ago our consul at San Francisco reported that he had been much aided by the commissioner in his efforts to stop crimping; but yet local influence prevails, and the fact that the magistrates and the judges of the lower courts are not appointed by the Federal Government, but by the separate States, restricts almost to nothing the power of the Government to interfere.

It results from the power of the crimps and the disorganization of justice, that, in the first place, seamen can desert with impunity abroad; next, if they get into the hands of a sharp lawyer, they can bring an action against the master for wages, and libel the ship, which is not able to leave port till the case is settled. The end of this is generally a compromise by which the master pays a sum down, which is, no doubt, divided between crimp and seaman, and perhaps others. If the master, as he has sometimes done, with the assistance of the consul, waits out the case, it sometimes goes against him, the court refusing to recognize the British articles of agreement. There have been several cases of this kind, which have been the subject of correspondence with the foreign office, and representations have been made to the United States Government. Of late we have not heard of such cases, and it is to be hoped that they are becoming rare.

The time comes, as in England, when the seaman becomes no longer profitable to the crimp, and he must get rid of him. By combinations between them, and, it is to be feared, by collusion with the lower class of masters also in some cases, the crimps control the market, fix the amount of advances, and make it impossible for seamen to be obtained except through them. The master names the number of men he wants, and the crimp brings them up to the consul's office to sign articles. He then takes them back to his house, and some day after that they find themselves waking up from drunken sleep on board a ship. It does not always follow that it is the ship they have signed for, or even that their rates of wages are the same as they agreed to; so that when they come to be discharged they have to sign another person's name to get their wages, and to allow deductions from wages for advances which they perhaps have never received. In this way the crimp may get the advances of one or two or more men without accounting to them for a penny.

These advances are enormously greater than any given in this country. In addition to such charges as the crimp may make against the seaman for supplies of clothes, lodging, &c., the master has to pay so much per head for each man "blood-money," as it used to be called, and all this has to come out of the seaman's wages. Two, three, or four months' advance, when shipped for long voyages, is made, and instead of £2 10*s.* or thereabouts, the advances amount to £5, £10, and more. In a recent case at Astoria a master states that he had to pay about £18 a head for his men, and $20 to $25 is a usual advance for a man engaged at New York on a short voyage, *i. e.*, the run across to Europe, which may not occupy a month.

The present law prohibiting sailor landlords and their runners from boarding ships on arrival in ports of the United States is said to be poorly enforced, and as a means of repressing these illegal practices entirely it is suggested that more stringent provisions be adopted, which should apply alike to American and foreign vessels.

The form of an act, based upon the English law, may be found in the Appendix (page —). In connection with and as supplementary to the law preventing persons from boarding inward-bound ships, the English Government has established what is known as the "Midge system," through the operation of which the Government officers board ships about to arrive at the port of London by means of a steamer called the Midge. Other steamers have performed this duty at other ports since 1879. The accounts of the seamen who wish to be sent to their homes are made up by the masters, and the men are taken to the nearest railway station and tickets purchased for their place of residence, their wages and clothing being subsequently forwarded. By this means the sailor's wages are saved to him, and his family get the benefit of what might otherwise be squandered at the ports of arrival. It is stated that over a million pounds sterling of seamen's wages have been transmitted in this manner, and about 90,000 sailors sent home.

The British "payment of wages and rating act" of 1880 has a section making the provision against unauthorized persons boarding inward-bound ships applicable to foreign vessels under certain circumstances.

The section (6) is as follows:

"Whenever it is made to appear to Her Majesty—

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"(1) That the Government of any foreign country has provided that unauthorized persons going on board of British ships which are about to arrive or have arrived within its territorial jurisdiction shall be subject to provisions similar to the provisions contained in the last preceding section as applicable to persons going on board British ships at the end of their voyages;

"(2) That the Government of such foreign country is desirous that the provisions of the said section shall apply to unauthorized persons going on board ships belonging to such foreign country within the limits of British territorial jurisdiction—

"Her Majesty may by order in council declare that the provisions of the said section shall apply to the ships of such country, and thereupon, so long as the order remains in force, those provisions shall apply and have effect as if the ships of such country were British ships arriving, or about to arrive, or which had arrived, at the end of the voyage."

Extract from British merchant shipping act.

[Page 111, clause 176a, 1875. London.]

Whenever it has been made to appear to Her Majesty that the Government of any foreign state is desirous that any provisions of the merchant shipping acts of 1854 to 1873, relating to the engagement and discharge of seamen, shall apply to the ships of such state, Her Majesty may by order in council declare that such of the provisions as are in such order specified shall, subject to the limitation, if any, contained in the order, apply, and therefrom, so long as the order remains in force, such provisions shall apply subject to said limitations to the ships of such state, and to the owners, masters, officers, and crews of such ships, when not within the jurisdiction of such state, in the same manner in all respects as if such ships were British ships. It shall be lawful for Her Majesty, from time to time, by order in council, to add, to alter, or to repeal any order made under this section. (Victoria, chap. 85, sec. 11.)

ABUSE OF SEAMEN.

A great deal has been said in recent years about the ill-treatment of seamen by the officers of American ships. But tales of cruelty by mates and masters of vessels of all maritime nations are of ancient date. The stories of Marryatt and Cooper are colored with exaggerated descriptions of this class. The flogging scene so vividly portrayed by Dana in his "Two Years Before the Mast," must be familiar to every sailor boy. Over a quarter of a century ago Mr. Nathaniel Hawthorne, then United States consul at Liverpool, took occasion to address the Government on the subject, which was at that time attracting the attention of the English newspapers. Mr. Hawthorne attributed much of the evil then existing to the laxity of our maritime laws upon the discipline of seamen, which he says may have been wise and effectual for the welfare of all concerned at the time of their enactment, but which had in view a state of things that had entirely passed away, "for they are based upon the supposition that our ships are chiefly manned by crews whose homes are on our own shores."

The fact that so many of the men shipped on board American vessels were foreigners, without any preparation for a seaman's duties, was assigned as another cause, and he further remarks:

On this latter class of men falls the most of the cruelty and severity which have drawn public notice and reprobation on our mercantile marine. It is a result, not as one would naturally suppose, of systematic tyranny on the part of the constituted authorities of the ship, but of a state of war between the classes who find themselves for a period inextricably opposed on shipboard. One of these classes is composed of the mates and the actual seamen who are adequate to the performance of their duty, and demand a similar efficiency in others. The second class consists of men who know nothing of the sea, but who have imposed themselves, or been imposed, on the ship as capable of a seaman's duty. The deception, as it increases the toil and hardship of the real sailor, draws his vengeance upon the unfortunate impostor. In the most cases investigated it appears that there was not one of the sailor men, from the second mate down to the youngest of the boys, who had not more or less maltreated the landsmen, but in scarcely a single case was it possible to implicate the master as tak-

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ing a share in these unjustifiable proceedings. Thus, there is a great mass of petty outrages, unjustifiable assaults, shameful indignities, and nameless cruelties, demoralizing alike to those who perpetrate and those who suffer, falling into the ocean between two countries, which can be punished in neither, and as such a state of things can be met by no law now in existence, new legislation would seem to be required.

Since the above was written twenty-nine years have elapsed, and a number of laws have been passed by Congress with a view to meet the condition of things referred to. A merchant shipping act was adopted in 1872, which contains the code of discipline now in force in our merchant navy. The act of June 26, 1884, also embodies additional legislation respecting officers and seamen, especially relative to their dealings with our consuls abroad. But it must be admitted that the relative condition of officers and seamen has not been much improved by the legislation referred to, as the same difficulty occurs in crews made up chiefly of incompetent seamen, who are the butt of the old sailors as well as of the officers, has still to be met, and is doubtless the cause of much of the trouble that arises to-day between the officers and merchant seamen on our vessels. The evil appears to originate now as it did then, first, in the scarcity of good native-born seamen to make a majority of the average ship's company, and can only be effectually removed by offering greater inducements and encouragement for our young men and boys to follow the sea as a profession. This can best be done by assuring them that employment on shipboard promises a good remuneration and equal prospects of promotion to similar employments on shore.

A more strict code of discipline than that embodied in the act of June 7, 1872, which is all that we have to govern the conduct of men at sea, also seems desirable in order to effectually repress misconduct on the part of the crews, as well as to stop the abuse of unfortunate men who are unable to perform all the difficult parts of a seaman's duty. But it should never be forgotten that the influence of a master who has the interest of his crew at heart and who demonstrates that his sympathies are with the men in their toil and exposure, by those nameless acts of kindness which, if he pleases, may fall to his lot, must needs be great. They are not costly; nor would they overwhelm him with labor to perform them; and to such a man, the master of an American merchantman, the praise of his crew at the termination of a voyage for his courage and humanity, would be more than coveted. He would sail again with the finest crew that ever left port, only too anxious to ship under his command.

INSUBORDINATION OF SEAMEN.

Cases of insubordination and mutiny at sea were not uncommon half a century ago, but that they have become much less frequent in recent years is regarded as an evidence of the gradual improvement of American seamen. A system of inquiry into the subject has been instituted through the medium of the United States shipping commissioners, which appears to prove that cases implicating seamen in anything more than the usual disorderly conduct of half-intoxicated men are quite rare; but the fact that cases of mutinous insubordination do sometimes occur seems to prove that the law as it now stands is inadequate to meet the difficulty by failing to prescribe proper penalties or punishments to be administered to disorderly or mutinous seamen, enabling the officers in the merchant service to maintain a healthy state of discipline and authorizing them to suppress crime and mutiny when they break out on shipboard at sea. Although sailors as a rule are peaceably inclined, there are occasionally met with among them some of the worst specimens of

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humanity—sometimes lawless characters who escaped from prison and ship in our vessels abroad in order to escape the hangman's rope. Occasionally fierce desperadoes are met with on board ships, ready to ply their trade of ruffian or even murderer at the slightest provocation; and this fact renders the position of master or officer of a ship doubly hazardous.

It is not alone the dangers from the elements and from pestilence that "they who go down to sea in ships" must encounter; they must also be prepared to meet mutiny, arson, and perchance murder itself.

An example of the latter kind of danger of a remarkably desperate nature was recently reported by the United States consul at St. Helena Island. It relates to the case of the American ship Frank N. Thayer, which in point of bloodthirsty desperation recalls the scenes enacted on the decks of the Spanish galleons and buccaneers of a former century. Fortunately such scenes of cruelty and madness on the part of sailors are now of very rare occurrence; but this isolated case goes to show the importance of watchfulness on the part of officers at the time of the engagement of their crews.

The consul says:

"It is my painful duty to report for your information a sad calamity that has befallen an American ship and a portion of her crew at sea between this island and the Cape of Good Hope.

I have been engaged with the investigation of the case since Monday morning, the 11th instant, when the survivors arrived here in an open boat, and I shall endeavor to state the facts as briefly as possible here.

The Frank N. Thayer, of Boston, Robert K. Clarke, of Jamaica, Long Island, captain, was a splendid ship of 1,592 tons burden, and was built at Newburyport Mass., in 1878. She had taken an American cargo to the East, and took a return cargo of hemp at Manila, from which port she sailed for New York on November last past.

On the day he sailed from Manila the captain shipped two of the native Indians to fill up vacancies in his crew. The voyage was prosperous, and devoid of untoward or unhappy event until Saturday night, January 2, at midnight, when in latitude 25° S. 0° 40′ W., at the change of the watch, the two Indians fell upon the mates, E. Holmes, of Bath, Me., and W. Davis, of Brooklyn, N. Y., and stabbed them fatally. One then hurried to the cabin to serve the captain in like manner, but having been aroused by a cry of "Captain Clarke! Captain Clarke!" made by the second mate as he fell dead at the door of the fore cabin, the latter was on his way to the deck without suspicion of danger (thus escaping from being murdered in his bed), and was met at the top of the after companion-way and stabbed by one of the Indians. He fought the assassin as best he could in his defenseless state, but his bare feet slipped in the blood which covered the steps, and as he fell the Indian plunged his knife in his left side, and fled up the steps, leaving him for dead.

The captain, though his wounds were such as prove fatal to ordinary men, rallied almost immediately, and provided himself with a revolver. He then returned to the after companion-way, and called to the man at the wheel (Malone) to shut the upper door. "I can't, sir," said Malone. "Why not?" asked the captain. "There's somebody behind the door, sir." "Who is it?" again demanded the captain, rapidly losing strength by the bleeding from his wounds. "I can't tell," replied Malone.

From this the captain concluded that Malone was in the conspiracy, whatever it was (for he was bewildered as to the cause or purpose of the outbreak and ignorant as to who were parties to it), and at once shut and locked the inside doors. Going through the fore cabin to close the door leading to the half-deck, he found his second mate lying dead at the door of the cabin. His heart sank and his perplexity increased, for he knew that both mates must be dead, or they would come to his assistance.

Almost fainting from loss of blood, by a superhuman effort he preserved consciousness, and was determined to fight till death to protect his wife and little girl, who had been aroused from their sleep to find him in that awful plight.

Mrs. Clarke, utterly dismayed by the unthought-of horror that confronted her, hastened to do what she could for the captain, while the little daughter, paralyzed by fear, clung to her in speechless terror.

They were alone in the cabin, for at the sight of blood the Chinese steward, Ah Lam, had fled and locked himself in his room. The captain sat in a reclining position in a corner to enable himself to command the doors and windows with his revolver, while his wife endeavored to stanch the flow of blood from his wounds. He was

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blinded by that from the gashes on his head, which consisted of several awful stabs on top of his head, one ear nearly cut off, a cut which extended across the nose and both cheeks, starting just below the left eye, and the worst one on the right temple, which severed the artery, and extended from about the center of the eyebrows to the ear, laying the skull bare in that region. From the stab in his left side the lower lobe of the lung protruded several inches; but with great nerve and presence of mind Mrs. Clarke pressed it back and bandaged it securely.

Meanwhile other scenes in the tragedy were being enacted. The first mate had staggered into the forecastle and fallen on the floor in a dying condition. The men there went to his relief, and he told them that he had been cut to pieces by one of the Indians; that he and the second mate were sitting on the after-hatch talking when the two Indians came up, one saying he was sick, and as he spoke these words they both began stabbing them with knives in each hand. At this some of the men started out, arming themselves with capstan-bars, in search of the assassins; but one or both of the Indians were lying in wait for them, and quickly cleared the decks by stabbing four of the party; namely, M. Staal, J. Neilson, A. Olsen, and C. Smidt, who escaped to the forecastle and are now here in hospital. The Indians then slew Malone at the wheel and pitched him overboard; brought the carpenter, E. Booth, out of his room (which was on deck near the cook-house), and served him likewise; and having barricaded the forecastle doors so that no one could get out, they returned to the attack on the cabin.

They smashed in a window opposite where the captain sat, and one told the other to go in. The captain fired two shots at the window, prematurely, thus startling them away without hurting them. With oaths and curses of surprise and disgust they went away, locking all the shutters and barricading the outside door of the companion-way.

One of the party who came out with the capstan-bars, R. Sandbergh, had escaped to the upper rigging in the midst of the fray and witnessed all these demons did on deck in the next thirty-three hours, during which they held possession of that noble ship.

Another man, C. H. Hendricsen, had fled to the after part of the ship and taken refuge in the bath-room, which opened upon the after companion-way outside the cabin door, before the Indians had closed the outer door of the companion-way.

Such was the situation during January 3 (Sunday), except that the first mate had died at 3 a. m. in the forecastle, and Antone Sercin, who was on the lookout, was found in the carpenter-shop and butchered by the Indians at about 5 a. m. The captain lingered between life and death; but during that awful day, that was like an age, he managed to get on the table and fire a few shots through the skylight in the fore cabin. But no one came to his relief, and his only discovery was that there was a man in the rigging, and that the two Indians had possession of his ship. Under the threats of death the cowardly steward had been compelled to fire a few shots when the captain was too weak to do so, but the Indians kept themselves screened and out of harm's way.

* * * * * * *

The cook, Ah Lay, was the only living man on deck except the assassins. They told him they would kill everybody except him and the captain's wife, and keep them until the last. They forced him to kill and cook chickens and make delicacies for them during Sunday, which they forced him to bring to them to their hiding place, in front of the fore cabin.

The doctor who has attended Captain Clarke here says it is surprising he did not die that day, and that his survival is largely the result of vast will power. Had he succumbed, the entire crew would have perished, for the Indians would have secured the fire-arms and shot them down in detail.

Thus the day and night of Sunday dragged gloomily along, despair, doubt, uncertainty, dread, and suffering holding sway in the cabin, and a similar state of affairs in the forecastle. The occupants of the latter consisted of six well men, as follows, Edward Augustsen, Henry Wilson, August Kuphal, William St. Clair, Louis Hanson, and John Kinman, the four wounded above named, and the dead mate. Of the four wounded above named two barely escaped bleeding to death, one of them being the young fellow, Mattias Staal, who evinced the most bravery during the fray, and of whom I shall speak further on.

Thanks to Providence and the gentle care of his wife (who, so far as human aid extends, may justly be called the saviour of the crew), Captain Clarke felt somewhat stronger on Monday morning, January 4, though he had tasted neither medicine, food, nor stimulants since Saturday at supper-time. The medicines and liquors for medicinal use, were in the chest in the bath-room, which could only be reached by going out of the cabin, and the captain had been too weak to venture this risk.

As the water in the cabin was exhausted by Monday morning and it was absolutely necessary to procure some, the captain went out, revolver in hand, and, trying to enter the bath-room, found it fastened on the inside. When he recognized the captain's

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voice Hendricsen unfastened the door, and the captain found him armed with a broadax that was kept there, prepared to defend himself against the Indians. He informed the captain of what he knew about the mutiny, who now realized for the first time that the Indians were the only culprits. Hendricsen was brought into the cabin and armed with a revolver, the captain still quite uncertain as to the fate of the balance of his crew, but determined to make a desperate effort to regain possession of his ship.

During Sunday night the Indians had carefully prepared to play their last card. They had taken a large door and lashed it on edge to the poop railing about 12 feet forward and to the left of the skylight. Back of this door they had fastened a 2-inch pitch-pine plank and the bed and pillows from the carpenter's room as a breastwork, from behind which they were prepared to harpoon anybody who appeared at the skylight. For this purpose they were armed with one good harpoon and several javelins, made by lashing knives to the ends of sticks ten or twelve feet long.

The firing from the cabin was resumed early in the morning, and by dextrous aiming and shooting through the wood-work of the cabin one of the Indians was hit by Hendricsen, and, running forward, he cast a plank overboard and jumped into the sea. Sandbergh, seeing this, came down from the rigging, and the steward handed him a revolver through the skylight.

The captain broke open the upper door of the companion-way with the broadax, and at almost the same time the men broke out of the forecastle, Ah Lay having given them an ax.

In the midst of the tumult that followed smoke was seen issuing from the after hatch, which was always kept open, as it led to the sail-room, the half-deck containing the stores and over a hundred bales of hemp.

The captain was on deck, prostrated as he was, and ordered the men to go in and kill the assassin who had fired the ship. They went down the after hatch, fired several shots which they supposed had killed the Indian, and came up driven by the smoke to work on the fire. However their other conduct may be viewed, there is no doubt that they labored manfully to put out the fire. They took the hose in through the port from the main deck, and as they did so the steward called the captain to come aft, as Mrs. Clarke was locked in her room and could not get out. It appears that Mrs. Clarke had locked herself into her room fearing further danger, and that she could not unlock it again; she handed the key through the window to the steward and he tried to unlock it on the outside, but failing, had come to the captain, who went to her rescue. The key then broke in the lock, and the captain forced the door by a blow with the broadax. Assuring his wife that there was no further danger, he returned to the deck to find the fire gaining rapidly, and that the incendiary had come up through the hatch while the men were fighting the fire and jumped overboard.

The rest is soon told. Owing to the inflammable character of the cargo the fire was beyond control in two hours, and the only chance of saving life was to take to the boats. It was about noon when two boats were got ready. The wounded men and the following provisions were put into the larger boat; 160 cans of oysters, clams, meats, and sardines; 150 pounds of flour, 12 pounds of crackers, 3 jars of preserves, 200 gallons of water.

The smaller boat was swamped with a cask of water, and all hands got into the large one, in which they were packed like sardines in a box. They waited about in the vicinity of the burning ship until Tuesday, January 5, at 10 a. m., when, abandoning the hope of being picked up, the captain had some blankets tacked together for a sail and started for St. Helena, where they arrived on Monday morning, January 11, at about 3 a. m., when Mr. Pritchard, the harbor-master, did all he could to expedite their landing and showed consideration which is worthy of praise.

I cannot close this report without expressing my sincere admiration for the skill and humanity of Captain Clarke in the voyage of more than six hundred miles in an open boat by far too heavily laden; and it appears to me that he is deserving of some public recognition for his conduct. Large vessels that want to call here often miss the island altogether, carried by currents off their track or going by in the night or in a fog. Once past there is no getting back, for the southeast trade blows perpetually.

I must not fail either to mention the bravery of the boy Mattias Staal, who fought the Indians with his capstan-bar when the other men had fled and until he fell with three terrible stabs in his body.

That there appears to have been some reason to blame a portion of the crew with cowardice I cannot deny; but I will not constitute myself their judge as to that, for the circumstances were wholly without parallel and in the extreme terrible.

Malone and Hendricsen seem most open to the charge, for they were in a position to help the captain and failed to do so.

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SHEATH-KNIVES ON SHIPBOARD.

Serious accidents of late years have occurred on shipboard in consequence of the freedom with which sailors use their knives in quarrels among themselves. Men have stabbed each other in the heat of passion, generally in some trivial dispute or when partly intoxicated.

The situation of officers in the merchant service is considered to be one of considerable danger at times when starting upon a voyage with a drunken crew to whom they are strangers. Several officers have been killed by seamen during the past year while in the performance of their regular duties under circumstances alike aggravating and distressing. In the last case reported the only cause of the tragedy was a dispute about the careless manner in which the seamen performed certain work. A ship-owner who wrote me, inclosing an account of the affair, closes his letter with the following language:

> Had the United States law forbidding sailors to carry sheath-knives been enforced on the brig Mary C. Mariner, the above tragedy could not have taken place. But the master cannot always force the crew to give up their knives after the ship is at sea, and yet the law fines him $50 if he permits them to carry sheath-knives, but says nothing about punishment to the sailor.

But, however lamentable such occurrences must always be, the cause, if as stated above (the right of sailors to carry sheath-knives), appears to be assented to by both sides.

The fact seems to be that section 4608 Revised Statutes has been found to be impracticable, and has become obsolete by almost common consent of seamen and officers.

A sheath-knife is so necessary a part of a sailor's outfit that, notwithstanding the statute, a seaman would in most vessels be blamed if he did not have one. There is no penalty in case a sailor carries a sheath-knife, and no regular examination of their effects is made to see if they carry them on board, so that the officers of the vessel fail to execute their duty in the premises because they want the men provided with knives which are so necessary at every turn on shipboard. There is a knife which used to be used in the Navy, called the "hawk-billed jack-knife," that makes a safe and convenient knife for seamen to use, although its first cost is a little more than that of the common sheath-knife. The blade is about one and a quarter inches wide and square at the end, and opens and shuts easily, so that it cannot be used as a dirk. At the end of the handle is a hole for a lanyard, by which it may hang to the sailor's neck when not in his pocket, where it is usually carried. Such knives would be a benefit to the merchant service, and a boon to sailors themselves, as they could not use them with fatal results in their quarrels with each other.

There is no substitute for sheath-knives mentioned in the law referred to, and I think this a matter of so much importance that it ought to be amended. I believe the safer way would be to make it an offense for seamen to bring knives of any kind, or other weapons on board, and to provide that the vessel supply the crew with knives of a certain description at the same rate above cost, as other articles furnished from the slop-chest, and legislation to that end is recommended.

ANNUAL WASTE OF SEAMEN.

The average yearly waste of seamen in the merchant service, resulting from different causes, such as deaths, illness, desertion, and accidents, and from those who abandon sea life to engage in some other pursuit, is beyond the annual waste in employments on shore, where those en-

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gaged in them, if not so much exposed to danger, are more regular in their habits and not subject to the changes of climate, &c., that are inevitable to seafaring life.

The annual waste of seamen in the British merchant marine has been computed at 1,700 men. This great loss has to be made up by an equal supply from outside, or the service would soon run down. We have not in this country reached such a complete system of registration of seamen as has been attained under the British flag, so that the amount of annual loss from these causes can only be approximated; but, judging from the most reliable data at hand, I think it amounts to 4,000 men per year, in which the lake service is included.

If we estimate that it requires 50,000 men to man our merchant vessels of all kinds, the yearly waste amounts to 8 per cent., and we must, in order to hold our own in this respect, obtain 4,000 fresh men every year from some source for our mercantile navy. In former years, when the occupation of seamen was more popular than it is now, there was no trouble in filling the ranks of the service with boys and young men who were inclined to a sea life, but of late years the demand has had to be supplied by a foreign element, so that now only about one-third of the seamen who man American ships in the foreign trade are native Americans. This is an unfortunate state of things on more accounts than one. The Navy has, in times of war, had to draw from the merchant service for its seamen, and when it is considered that two-thirds of the number so drawn must be aliens, it may be said that we will have to depend upon foreigners to fight our battles!

It is difficult to estimate with precision the number of seamen that may be needed by our mercantile navy in the future.

The over-sea trade of the country is fast increasing, and if we increase our share in the work, more seamen, as well as ships, will be required. On the other hand, the transition from rail to steam is still in progress, causing a diminution in the proportion of seamen to the amount of work performed, and the economy of labor, by means of the improved mechanical appliances, affords some grounds for the belief that the difficulty threatened by a scarcity of seamen will in time regulate itself. The establishment of more training-ships for boys and the inauguration of a regular system of maritime apprenticeship are suggested as among the best means of increasing the number of native American seamen.

RELIEF AND PENSIONS.

One of the methods of rendering a sea life popular, and thereby increasing the number of those who follow the sea for a livelihood, is to provide for the sailor in his old age, or in case of disability or sickness.

The natural love for adventure inherent in youth makes the sea life attractive to many of that class, and they may not care so much for these bounties, but such benevolent provisions are doubtless an inducement for the sailor to continue his perilous vocation, after once having commenced it, by adding to his sense of security. They also have the effect to bind him to the flag under which he sails with a more settled attachment than is otherwise the case.

The life of the sailor is necessarily one of hardship and danger. No class stands in greater need of provision against the infirmities of old age. No set of men are so improvident and careless about the future, and therefore so illy prepared to originate and organize a system on a scale extensive enough to provide for their own relief. Hence it has been thought proper in most maritime countries that the Government

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establish and conduct pension and hospital funds—some self-supporting and others partly gratuitous in their character. It may be proper to mention here the features of some of these charitable establishments. The institution of the *Invalides de la Marine* in France was introduced by the great Colbert in 1673. Perhaps no greater proof of his foresight is now apparent. It was reorganized in 1791, after a trial of over a century, and in 1793 was annexed by the Government of the revolution to the treasury, where it remained until the restoration in 1816, when it was placed under the direction of the *Ministère de la Marine.* Although Bonaparte confiscated a part of its capital, it had in 1850 a funded investment of over 90,000,000 francs. The establishment has grown to such dimensions that it is now divided into three separate branches—*La Caisse des Prises*, *La Caisse des Gens de Mer*, and *La Caisse des Invalides*, which last is charged with payment of pensions and relief to mariners in both the national and mercantile navies. The funds for the disbursement of the *Caisse des Invalides* are derived from an endowment from the state of *rentes immobilière*, bearing 5 per cent. interest, producing a revenue of from four to five million francs, and a revenue of about three and a half million francs from contributions and charges, and a considerable amount included in the annual appropriations, making altogether a total of about eight millions annual receipts, which is applicable for the relief of mariners of all classes. Forty officers are employed at the different ports to collect the revenue of the *Caisse des Invalides*, to advance the families of absent seamen the quota of their pay, and to liquidate the payment of all pensions inscribed within their districts at stated periods.

No complaints have been made of the management of the *Caisse*, and it is presumed that it is a great benefit to those interested.

After a certain period of service, regulated by law and *ordonnance* from time to time, every officer and sailor in the naval or commercial service is entitled to a pension from the *Caisse des Invalides*, a moiety of which goes to their widows and children, and, under certain circumstances, is sometimes enjoyed by their aged parents. The principal condition is service in the French navy. Every French seaman between the ages of twenty-five and fifty years is entered on the state register, and no man can go up for examination for the grade of mate or master until he has served a year and one day in some vessel of the French navy.

Mariners who have attained the age of fifty become entitled to pensions after their names have been borne on articles of French vessels twenty-five years. Captains who have been in command five years, out of twenty-five actual service in the foreign trade (*au long cours*), receive a *demi-solde* of 580 francs per annum, paid quarterly. At the age of sixty they receive 60 francs additional. Captains' widows, during their widowhood, receive half the pension of their husbands, and widows' children, up to ten years, receive 3 francs per month. Seamen who have had twenty-five years' service (*mixte*), partly in the navy and partly in the merchant marine, are, after forty-five years of age, entitled to a pension, or half-pension, regulated by classes according to their pay in the navy:

First class, 36 francs; 10 francs pension per month.

Second class, 33 francs; 10 francs pension per month.

Third class, 24 francs; 8 francs pension per month.

When the men of either class reach the age of sixty, 6 francs per month additional is allowed.

The pensions, though small, are considered a great help, and have had the effect of making the system of maritime inscription, which has

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been brought to great perfection, both honorable and popular. Over 150,000 men between the ages of eighteen and fifty are now borne upon its rolls. Fishermen and all other followers of the sea are embraced in the inscription.

The French, from their inability to cope with the English, have borne the general reputation of making indifferent sailors, but those living along the north coast of France must be acknowledged to form a remarkable exception. A British consul, in his report, has spoken in great praise of the hardy fishermen of Breton as a race of sailors of whom France may justly be proud:

> Austere in their faith, full of trust in Providence, dauntless in danger, patient in suffering, bearing deep love, but also profound hate, ever ready to lay down their lives when duty or affection requires, they form a striking light to the shades often found in other classes of the French population.

The institution for the relief of invalid seamen, in France, embraces those in both the national and mercantile navies. It is maintained by contributions amounting to at least 3 per cent. of the wages earned by those engaged in the service, and the revenue arising from these contributions and from interest on the funded capital now amounts to $1,500,000 per annum.

In Greece there is established a pension fund for merchant seamen, supported by the payment of 2 drachmas per month from seamen and 3 drachmas per month from masters. The contributors have to pay for twenty years before being entitled to receive any pension. All seamen having served twenty years in the Greek marine, if infirm or disabled, receive 20 drachmas per month, and masters 30 drachmas per month from the fund.

In Norway, which now stands the third among maritime nations in point of tonnage, regulations have been established providing pensions for seamen in every seaport town and district, by means of independent charitable institutions, called "establishments for the support and relief of distressed seamen, their widows and children." The law provides for a registrar, whose duty it is to superintend the engagement of seamen for foreign voyages and make it obligatory that articles of agreement be signed in his presence before any vessel can clear at the custom house, it being the duty of the master, with the whole crew, to appear before the registrar for that purpose. That officer then explains to the men the nature of the contract, and gives a printed copy of the laws and regulations to the master for his guidance. A *pro rata* contribution from each man's wages is agreed upon, which, on completion of the voyage, is deducted by the master and paid to the registrar, who deposits it with the cashier of the institution. Should any seaman be engaged who does not belong to the port of sailing, the amount of the contribution is remitted to the cashier of the institution where the sailor is registered. When the voyage is ended, the master has to appear before the registrar with his crew, if they are to be discharged. The plan of separate registering districts is of comparatively recent existence, formerly there being a general fund for the entire country. This was divided among the separate districts, and has been found to work better in keeping the men attached to their homes. In the port of Christiania the seamen make a voluntary contribution of one shilling from every dollar earned.

Institutions of a similar character exist in Sweden and Holland. In fact there are few maritime countries in which there is not some law making it obligatory on seamen to contribute a portion of their wages to a fund for their own benefit.

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In Holland the "Seamen's Hope Society," established for their benefit, is supported by the contributions of mariners and is said to be an admirably designed institution. A contributor to this society, when he engages to serve under any other flag but that of Holland, forfeits all claim to relief for himself, his wife, or children, which seems a hardship in view of the uncertainty of always securing employment in Dutch vessels, as he would be bound to refuse to serve on a foreign vessel, though needing a crew.

In Sweden the contributions of the seamen are aided by a tax on tonnage. The system adopted for their relief is said to be perfect.

In England there was formerly a merchant seamen's fund established by act of Parliament, in 1747, in compliance with a petition to that body from the seamen of the country, in pursuance of which one shilling per month was stopped from the pay of each man. The object was to provide for aged and disabled mariners, their widows and orphans. The Government undertook the management of the fund, but its administration was intrusted to a local committee at each port. No general system was framed and no regular audit of accounts provided, in consequence of which confusion and jobbery is said to have worked into the accounts, resulting in financial difficulty. At some ports pensions as high as ten or twelve pounds were paid, and at others only two or three pounds. In consequence of these discrepancies discontent and trouble arose, and, the fund becoming bankrupt, the act creating it was repealed in 1851, and the affairs of the committees which had administered the fund were settled up at the public expense.

The principle adopted in the new arrangement was to take all the assets and pay existing claims to pensions. After over thirty years the process was nearly completed at a cost to the country of upwards of £1,000,000. But as the act of 1851 had left it optional with seamen to pay their subscriptions in support of the fund, it was found that only about one-twelfth of the men continued to contribute, showing that they had little faith in the project, and the Merchant Seamen's Fund was wound up because it had become insolvent. It is believed, however, by most persons familiar with the character of seamen, that in order to make such a fund self-supporting, the contributions must be compulsory. Mr. Lindsay, who begun his life as a sailor before the mast, and advanced to the command of a ship, and ultimately rose to be a large ship-owner and member of Parliament, prominent for his acquaintance with all questions on shipping, said that any fund based on the voluntary principle would be a failure, as not one-third, and perhaps not even a sixth, of the seamen would subscribe to it. They would admit that it was a boon, but they would think no further about it. When paid their wages they would demand the last penny. Besides, voluntary contributions in the higher orders of society had signally failed of their purpose.

The sentiment of that country appears to be in favor of a compulsory payment by seamen for the establishment of a permanent fund for their support when disabled in the line of duty or old age renders them unfit for further service. It has been remarked that sailors in their youth, while the exciting love of adventure is leading them into peril, do not think of the future, never apparently realizing that they may live to be old. This feeling seems to be almost universal among those who follow the sea, resulting, perhaps, from the fact that they see so many of their comrades taken off in different ways, while so few old men are to be met with among them. Moreover, being a scattered body, whose lives are chiefly passed on shipboard, of necessity far from their homes, they

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have not the opportunity, if they had the inclination, that people on shore possess of organizing and, by concerted action, carrying into effect any project designed to provide against the contingency of old age. And yet it should be done *for* the sailor, as it cannot be done *by* him.

In the United States the framers of the early navigation laws were not unmindful of our seamen. The act of July 16, 1798, authorized the President to receive donations of real and personal property for the erection and support of hospitals for sick and disabled seamen. Based upon this statute other institutions for their relief have been founded, and contributions for their support have been drawn from seamen's wages. By an act of 1811 the collection from seamen's wages for this purpose was fixed at 20 cents a month, but the amount raised from the assessment not being adequate to the support of the number of hospitals needed the rate was subsequently doubled. But the act of June 26, 1884, abolished the further collection of these dues from seamen, and provided that the Marine Hospital Service should be maintained out of the fund collected from the assessment of the tonnage tax.

It is questionable, in view of the benefits that might be derived from a pension fund, whether, instead of abolishing these compulsory contributions, it would not have been better to have continued them and applied the proceeds to that purpose.

The payment of 30 cents per month would, it is believed, bring in a sufficient sum to found a pension fund for the seamen of the merchant marine of the United States, which would not be objected to by sailors if, by so doing, they were insured therefrom against the disasters to which they are exposed, loss of health, or the infirmities of old age.

At some of our ports there are private asylums for the support of sick and aged seamen. "The Sailors' Snug Harbor," on Staten Island, New York, is an example, and probably the wealthiest and oldest establishment of the kind. The history of this institution may be given in a few words. In the year 1801, Capt. Robert Richard Randall, of New York, bequeathed the major part of his property located in or near that city in trust to the chancellor of the State of New York, the mayor and recorder of the city of New York, the president of the Chamber of Commerce, the president and vice-president of the Marine Society, the senior minister of the Episcopal church, and the senior minister of the Presbyterian church, all of the same city, to erect and build upon some eligible part of the land where he resided an asylum or marine hospital, to be called "The Sailors' Snug Harbor," for the purpose of maintaining and supporting aged, decrepit, and worn-out sailors.

The act of the State legislature incorporated the trustees of the institution February 6, 1806. On the 11th of October, 1831, the cornerstone of the "Sailors' Snug Harbor" was laid. Large and commodious buildings have been constructed, and the property having rapidly appreciated in value, the independence and continuance of the institution are assured.

The principal conditions of admission to the benefits of the Harbor are, that the applicant shall have been a sailor for at least five years under the flag of the United States, either in the merchant or naval service, and that he has not the adequate means of self-support, either from labor or other sources, and is free from any contagious diseases.

In reflecting upon the necessity of providing for aged and destitute seamen, and upon the many good results of private donations and bequests of benevolent men and women who have become interested to

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aid the distressed by founding homes and asylums, I cannot but consider how much more efficient would be these efforts if they had even the moral support of the Government.

In any view these establishments for pensioning the aged and caring for the sick and disabled mariner stand before the world as institutions of charity, and if the Government is desired to take upon itself the control of similar asylums to be supported by monthly collections of 30 cents from each seaman, there would seem to be but little objection to such a scheme, and the extensive good it would do is obvious.

As was truly said by Mr. Dunn, chairman of the Committee on Shipping, &c., in a speech in the House on the passage of the last shipping bill, "the hospitals for the sailors have sprung out of the common sentiment of humanity of the whole civilized world, that takes care of the sailor. He is a homeless creature; he has no home anywhere except upon the shore upon which he may be cast by the exigencies of his avocation. The world has provided for him a hospital at the common expense of all the civilized maritime nations."

Few as they are in number at present, and circumscribed as most of them must be by lack of funds, they have endeavored to do good to sea-faring men. Some of them, indeed, have been eminently useful, and it is to promote the usefulness of the system that has led to the proposition that the Government should exercise an efficient control and extend its scope as the collections are made.

The evidence of wise and discriminating charity of the American people is seen in every part of the continent, and it may be expected that such a fund will be supplemented by bequests from time to time.

And if Congress, from sympathy with the cause and intention to permanently benefit and encourage our seamen, should by legislation adopt these methods, I think I shall be safe in saying, and the result will bear me out, that while the older of the present generation of sailors may have the more immediate fear of approaching privation and suffering lifted from them, a door will be opened for the entry of an educated and superior class of adventurous youth who love the sea, and knowing that the Government is interested in them, resolve to commence life in the only way to learn practical seamanship, and with hopes, likely to be verified, of achieving the highest honors of success.

IMPROVEMENT OF SEAMEN.

The manifold evils which beset the sailor are notorious. Cast adrift in the world without a home, or the benefit of early training, and mostly without education, unless endowed with a strong power to resist temptation he falls an easy prey to land-sharks, and is enticed into habits of intemperance and debauchery which inevitably bring in their train debt and disease. Efforts have been made to reclaim the sailor, to set him free from the sharpers and landlords who thrive upon his hard-earned savings. Numerous societies have been formed, and reading-rooms established for their recreation, and Bethels built in order that they may have suitable places in which to worship.

A great deal is due to the labor of such associations as the American Seaman's Friend Society in this country, and the British and Foreign Sailors' Society in England, and the philanthropic men and women who support and carry on the work of the Bethels now flourishing at nearly every seaport of the country. I have no doubt that the character of the American as well as foreign seamen has been improved of late years through such means.

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The establishment of sailors' homes, savings-banks, and kindred institutions, has had a commendable part in this reform.

To take first the great port of New York, the work of originating and organizing the American Seaman's Friend Society there was chiefly due to the Rev. John Truair, about the year 1825. It soon became the center from which radiated a multitude of seamen's Bethels throughout the country, spreading its missionary work even to foreign lands.

The Church Missionary Society of that city has a station on East River called the "Floating Church of our Saviour," located at the foot of Pike street; one on the North River known as the "Church of the Holy Comforter," 341 West street, and the Coenties Slip Station, where services are held on the dock. A "New Sailors' Home" has been established under the auspices of the society at 338 Pearl street. To copy from the late report of the board of managers of this society:

Commencing necessarily, humanly speaking, with small strength, meeting stern resistance from the nature and habits of the seaman as they then existed, as well as from those persons whose life it was to prey upon his ignorance and recklessness, this society has developed into a great institution. It has organized and brought into no little activity three mission stations, each with its active, faithful missionary, assisted by colporteurs and sextons in visiting the ships and bringing seamen to the services. It has proved its utility and necessity by its very success.

At these stations, on Sundays and certain week-days, are gathered congregations containing a rather remarkable proportion of apparently devout worshipers and attentive listeners.

At each of these stations is a reading-room, open daily, with books, papers, and stationery for the use of seamen. Here, men who would otherwise be exposed to temptation in various shapes, find safe company and innocent recreation. Here, too, are inducements to temperance in the influence of sober men. A gradual initiation to the habit is secured by pledges taken for a longer or shorter duration, as the men can find resolution to undertake it.

There is in Franklin Square a Sailors' Boarding House, under the control of the board, where the wanderer can find a home and a welcome, where he is in contact with good and religious influences, and protected, as far as may be, from his watchful enemies.

In the Sunday schools may be seen bright, orderly, cheerful children, learning to understand and appreciate the higher associations brought about them by earnest, faithful teachers, and putting on unconsciously the armor with which to give battle hereafter to the enemies they must encounter in life.

At the foot of Pike street, on the East River, lies the "Floating Church of our Saviour," with arrangements well pleasing to the eye and well adapted for the services of the church. It has been for many years in charge of the Rev. Robert J. Walker, to whose faithfulness testimony is borne, year by year, in these annual reports.

In West street, near Barrow, the Church of the Holy Comforter has for years conducted its services in an "upper room," to which the seamen, largely from the English and other steamers lying along that part of the North River front, resort. For this station the board of managers has commenced, on West street near Houston, the erection of a substantial chapel of brick, whose conspicuous tower on the river front will be, it is hoped, a beacon to direct the wanderer to his home. The means at present available permit only the completion of a portion of the entire design. This will furnish a reading-room, quarters for the sexton, and a room for a chapel for present use, small indeed for the purpose, but which must answer until means are obtained to complete the original plan. The board fervently trusts that this may not long be delayed. At this mission the Rev. Thomas A. Hyland does efficient work.

The services of the mission at large are kept up in a small and not very attractive room at Coenties Slip. There the missionary struggles manfully against great difficulties in the character of the surroundings. The people he has to deal with are chiefly from the canal barges which lie in the slips. In suitable weather he reads a short service and preaches on the pier, either in the open air or under a tent provided for the purpose. A congregation is gathered, sometimes numerous, always decorous, composed partly of passers-by, partly of boatmen, partly of the families of the latter, sometimes sitting on the decks of their boats. It is enough to encourage the missionary to speak forth the words of truth and soberness. This arrangement brings such words to the ears of many who would probably never hear them under any other circumstances. The missionary is the Rev. Isaac Maguire.

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The seamen who attend these various services are not there only as spectators. Many follow them in the prayer-book, as the places are announced, page by page. Many join in the chants and hymns.

Philadelphia has a very excellent institution, called the Pennsylvania Seamen's Friend Society, founded in 1843, and incorporated under the laws of the State in 1846. The Sailors' Home, 422 South Front street (Capt. Richard S. Lippincott, lessee), belonging to the society, is a spacious and well-furnished house, under the supervision of the ladies and gentlemen of different religious denominations, which is capable of accommodating some sixty seamen, and over one thousand of the more needy or destitute sailors are annually harbored and shielded from intemperance and vice in its many forms. Moreover, the benevolent operations of the society are extended to sailors afloat as well as ashore, over fifty vessels being supplied yearly with libraries, selected with a view to the moral and religious improvement of seamen; and thousands of tracts, in different languages, are also distributed where they will do the most good.

There are at the port of Philadelphia the following seamen's churches: Eastburn Mariners' Church, Union and Front streets, Rev. H. F. Lee, pastor; the Methodist Episcopal Bethel, Washington avenue, Rev. H. A. Cleveland, pastor; the Protestant Episcopal Seamen's Mission, Queen and Front streets; and the Baptist Bethel, below Christian street.

The Pennsylvania Seamen's Friend Society is assisted in its operations by the Female Seamen's Friend Society, which is a separate organization.

According to the report of this association, $650 were expended during the year in the purchase of useful articles, chiefly clothing, which were donated to needy sailors or their families.

Baltimore does not at the present time have any regularly established sailors' home. There is at the port one Seamen's Union Bethel, the chaplain of which, the Rev. Charles McElfresh, is of the Methodist Protestant Church.

The port of Boston is said to have the credit of originating the first movement in this country, and perhaps in the world, looking to the aid and improvement of seamen. The Bethel work among sailors began in England about the year 1814. But as early as May, 1812, an association was formed in Boston, Mass., called the "Boston Society for the Religious and Moral Improvement of Seamen." Its work consisted chiefly of publishing and distributing tracts of a suitable kind among seamen, and of holding services on board vessels in the harbor. This society seems to have merged into several others. The Boston Port and Seamen's Aid Society is a benevolent institution established over fifty years ago, and incorporated at Boston in the year 1867. It is supported by voluntary contributions, and by a large number of members, who pay one dollar annually, to be used by the society. It has also on its rolls seventy life members, who have contributed sums of over $30 each. The pastor (Rev. S. E. Breen), in his last annual address to the ladies and gentlemen of the association, speaks thus of the work performed by them:

Could some messenger of truth from the home of the blessed reach you; could some spirit of the deep anticipate the resurrection, when the sea shall yield up her dead; could the guardian angels of earth's every harbor tell their tale concerning the mariners, their wives and their little ones, upon whom you have left your impress; could that knowledge which transcends human capacity be had, a report of the moral and spiritual status of your work would be possible. But your tree is planted in Boston. Its roots are reaching into every part of the world. Its refined fruit is falling in every clime. Its tendrils cling to heaven's chancel. Hence the inadequacy of knowledge,

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the paucity of words, the brevity of time, and the insufficiency of space to make anything more than a partial outline of the year's work now closed.

There are three Bethels or missions for seamen in Boston—the Lewis Street Mission, E. H. Hanscom, of the Methodist Church, chaplain (which has been in operation some forty years); the Mariners' Baptist Church and Exchange, located at the corner of Hanover and North Bennett streets, A. A. Smith, chaplain; and the Boston Seamen's Friend Church, or mission, at No. 186 Hanover street, F. T. Nickerson, chaplain. The latter belongs to the Congregational denomination. All of these establishments unite in aiding and succoring distressed seamen, and do a great amount of good work.

The Mariners' House, or Sailors' Home, in Boston, under the auspices of the Boston Port and Seamen's Aid Society, is an excellent institution for seamen to resort to while in port. I annex a statement concerning this house received from its superintendent, Capt. J. P. Hatch:

In 1837 the "Mariners' House" was established as "a temperance boarding-house for seamen." In 1847 the present building was erected on North Square. It is a large, five-story brick building, conveniently located, facing south on this open square. On the first floor are a reading-room, a sitting-room, the superintendent's office, a large dining-hall, seating sixty-five, the kitchen, and the laundry (a large yard for drying clothes affords light and air in the rear). All these rooms are good-sized and high-studded. On the second floor are the library room, the parlor, the clergyman's room, superintendent's chambers, and a chapel room for religious exercises and lectures, and bedrooms for the better class of occupants. On the three other floors are the bedrooms and store closets. These rooms are of various sizes, for one, two, three, or four occupants, with single beds. They are all very clean and comfortable. In the basement are bath-rooms for the use of the seamen.

The institution is entirely non-sectarian. The form of religious worship is protestant. Morning prayers are held daily in the chapel room, and there are two or three evening services weekly. The house has ample accommodation for seventy boarders.

No liquors are allowed, and everything that is possible is done to prevent intemperance and immorality.

The food is ample and well cooked. In its general order and cleanliness the house compares favorably with our well-kept public institutions. It is under the constant supervision of the weekly visiting committee of the managers; and both the superintendent and his wife take excellent and faithful care of the house and of the seamen who come there.

It is well supplied with newspapers and books. In the superintendent's office there is a large safe, and every sailor on coming to the house is urged to deposit his money there for safety in the charge of the superintendent, who gives a receipt for it.

These are the chief features of the house, and the reports accompanying give a correct statement of its present condition.

One of the most earnest friends and supporters of the institution was Governor John A. Andrew, who for twenty-one years was secretary of the port society.

The corporation has a substantial fund, well invested, and is wholly self-supporting.

Its "Mariners' House" is the only sailors' home or house of the kind in the port of Boston.

If it should be the purpose of the Government, or of the Bureau of Navigation, to have an officially recognized Sailors' House in this port, the Mariners' House would most gratefully receive such recognition.

A Seamen's Friend Society was organized at Norfolk, Va., over sixty years ago, and has done much good in the past in assisting shipwrecked and destitute seamen, which work it still continues when opportunity offers. The institution is controlled by a president and board of twenty-four managers, selected, usually, a fourth from each evangelical denomination, viz, Methodist, Presbyterian, Episcopalian, and Baptist. In the election of a chaplain for the Bethel the question of denomination is not considered. The present chaplain, Rev. J. B. Merritt, is a Methodist. The seamen's Bethel is situated on Water street.

At Charleston, S. C., there is a port society which has with great liberality been doing efficient work in the reform of seamen since its establishment in 1823. A sailors' home was established here by a society

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of ladies as early as 1826. The present Sailors' Home is under the supervision of the port society, who purchased a commodious building at a cost of $10,000 and now carry it on as a temperance house for sailors, &c.

The Mariners' church is a non-sectarian place of worship, located on Church street. The pulpit in this church is unique and suggestive, being in the form of the bow of a ship called the "Bethel," with anchors hanging at her cat-heads, and apparently floating on the waves. The Bible lies upon a cushion and the preacher seems to be literally speaking out of a small ship. The present chaplain is the Rev. C. E. Chichester.

In the port of Savannah the foundation of a sailors' home was laid in 1874, but lack of the necessary funds prevented its completion, and it is now in possession of the "Savannah Port Society." There is one seamen's Bethel supported by the above-named society.

Pensacola, Fla., has one seamen's Bethel, conducted by the Rev. P. Olsen, chaplain of the Scandinavian church.

At Mobile, Ala., there is a sailors' home, a large roomy building, which is said to be out of repair. Adjoining it is a Bethel capable of holding a congregation of several hundred people, but it is said to lack funds for proper support. The history of these institutions as reported by Mr. J. W. Holmes, secretary, show that in January, 1845, the trustees of the Seamen's Home were incorporated by an act of the State of Alabama, and proceeded to purchase land and erect buildings. After the establishment of the home, the board of trustees purchased a ship for a hospital and a Bethel, the vessel being anchored in the lower bay, and the doctor in charge being a preacher also. The mission was sustained until 1860, when a severe storm caused the ship to founder and sink. The home was fitted up for sixty seamen, and was a temperance house under the board of trustees, and the services in the church, built in 1845, were kept up until 1860, when the trustees sold the church and erected another on a lot adjoining the home, which is still in use. Since the war there have been but few seamen in Mobile. However, the American Seaman's Friend Society of New York have at intervals made small appropriations to continue the work of the church, where services are conducted by ministers of various denominations in the city.

The port of New Orleans had been until a comparatively recent date a kind of "last ditch" for the sailor. Since the war, however, some of the best and most energetic work has been done there in reclaiming seamen of all nations, who at all times throng the port. The following account of the Seamen's Home and two Bethels located there was received from Capt. William Wright, late shipping commissioner at the port:

To Andrew Jackson Witherspoon, chaplain of the Seamen's Bethel and Home, of New Orleans (a second cousin of President Andrew Jackson), belongs the honor of having brought the Bethel to its present state of practical usefulness, with a name and fame that is respected and cherished at home and honored abroad as far as the blue waves roll.

The great and honorable philanthropist Mr. Paul Tulane, who gave the lot upon which the old Bethel was located (an incorporated institution that had ceased to exist during the late war), authorized the president, Mr. Maybièn, to sell the same, and to purchase with the proceeds of sale the ground upon which the present Bethel now stands.

Through the energetic exertions of the Ladies' Bethel Association, of which Mrs. J. A. Karstendick was and is president, the sum of $700 was raised from the proceeds of a concert, to which was added the amount of $1,300, realized, under the management of Capt. J. W. Cannon and William Campbell, from an excursion to Eads's jetties on

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the steamboat Robert E. Lee, enabling Dr. Witherspoon to open the doors of the Bethel on the 1st day of January, 1878. On Monday night, the 11th of February, 1878, Capt. Frederick A. Johnson, one of the officers of the United States customs, organized the Temperance Association of the Seamen's Bethel, as president, and issued over fourteen hundred certificates of temperance within fourteen months, and so energetic was the management, that the building was enlarged and extended to meet the demand for room *four times* within a period of eighteen months. Rev. Dr. T. De Witt Talmage gave the entire proceeds of his lecture in this city to make the third extension.

Since then it has been deemed advisable to purchase the adjoining lot of ground for a seamen's home, for the accommodation of such seamen as desired comfortable, respectable, and economical board while on shore.

The second story of the Bethel is the chapel, wherein divine service is held, and it is well attended. The first floor or concert hall is capable of accommodating about a thousand guests, and is frequently overcrowded on Monday nights, when accomplished ladies and gentlemen join with the sailors in musical feasts, orations, and recitations, that produce a healthy mental effect on all, and afford attractive recreation to the sailor, as well as to other classes of our citizens. It can be readily conceived that such gatherings cannot be otherwise than successful when the talent is bountifully contributed for the love of God and our fellow-man

In this building (although under the auspices of the Presbytery of New Orleans) sermons have been preached or addresses delivered at entertainments by clergymen of the Episcopal, Presbyterian, Methodist, Baptist, German Evangelical, Christian, and Unitarian Churches, and by the late Father Ryan (the poet priest), of the Catholic Church, while the Israelites of New Orleans have contributed their aid liberally in sustaining an institution that reflects so much credit upon our city, our State, and our country.

The liberality of sentiment of the New Orleans press has been a powerful lever in this good work, and it would be quite impossible, for want of space alone, to give the names of those who have participated as orators, contributors, and musicians, including the band of the United States man-of war Tennessee and the famous band from the City of Mexico. This Bethel is adorned by the flags of many nations, presented by authorized officials, and the walls are covered with likenesses of illustrious monarchs and presidents, together with testimonials of their appreciation for an institution that is working so much good for their subjects. The last presentation made was the flag of the Empire of Brazil, on behalf of the officers of the man-of-war Almirante Barroso, by her accomplished commander, Capt. Luiz Philippe de Saldanha da Gama, who invited and entertained in a princely manner, on board his ship, Capt. Fred. A. Johnson, the Bethel's great friend, Señor Emiliane Martinez, consul for Venezuela, Guatemala, and Colombia, your humble servant the writer, and over one hundred of the Bethel's friends. The organ used by the choir in the chapel is the gift of Madame Francisco de Barrios, widow of the late President of Guatemala.

The popularity and growth of this hospitable resort for seamen have and will continue to demand more extensive improvements and impose greater taxation upon the managers, to meet which the seamen's home has been recently extended, embracing a writing room and a reading room 16 by 60 feet, with additional sleeping apartments on the second floor.

To the chaplain, the Rev. Dr. J. A. Witherspoon, too much praise cannot be awarded for his untiring energy and patience, his public spirit, liberal views, and the rare gift that enables him not only to make but to retain friends, all of whom he utilizes in the cause of the seamen to which he has devoted himself.

THE LOWER BETHEL.

This Bethel is situated on Esplana street, opposite the United States mint. It was founded in 1869 by the Rev. L. H. Pease, a Methodist, under the auspices of the American Seaman's Friend Society, of No. 80 Wall street, New York, and continued under said patronage until 1881, when it became independent, and is now supported by small contributions from friends of the sailor, principally by the Rev. L. H. Pease, who is the owner of the building in which services are held. On the Sabbath the morning services are invariably in the Scandinavian language; the afternoon in English; and at night a lecture on the Bible by some competent person. The Sunday school attached to this institution is in a prosperous condition, and numbers over one hundred scholars. There is also a temperance society attached to the Bethel with a long roll of sailors who have taken the pledge. It remains open during the week days from 9 a. m. to 10 p. m. The Bethel proper was formerly an Italian Catholic church, and was purchased by the Rev. L. H. Pease and converted into a Bethel, containing a reading-room, with a good library, and the various daily papers, which are contributed. Here sailors of the lower district assemble and write to their friends in their distant homes. The materials for such are furnished free. There is also a weekly

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concert, at which some of our best citizens contribute their talents to the amusement of "those who go down to the sea in ships." There is no home attached to this Bethel, but a number of small boarding-houses are in close proximity.

On the whole, I believe, the upper and lower Bethels are doing a noble work, for which those engaged deserve the hearty thanks of every person who has the sailor's interests at heart.

In the city of Washington, D. C., there is a retreat and Bethel for seamen and marines, more especially used by those belonging to the United States Navy, the Rev. Samuel Kramer, who is acting chaplain at the navy-yard, having leased a building for these purposes. Kramer is an earnest worker among seamen, he having followed the sea for many years, serving on the U. S. S. Dolphin and frigate Brandywine, Commodore Jacob Jones, on her cruise in the Pacific Ocean in 1829, and other ships.

Mr. Kramer, having entered the church, was ordained for the ministry, and espoused the cause of seamen. He has given more than fifty years' service in aiding to better their condition, the most of that time serving without pay, and using his own means in supporting their cause. He has undertaken to establish a home and safe retreat for seamen when they are on shore, where they can come and spend the time surrounded by good associations free from many of the evils and temptations that await them on shore, and return to their vessels at the yard in due time without being under the influence of strong drink.

At San Francisco, Cal., a large and flourishing seaport has sprung up, as it were out of waves of the Pacific Ocean, within the last sixty years. It might have been expected that in a new city, coming rapidly into existence, charities of a moral and religious nature would be neglected, but such has not been the case. That port has already several well-conducted societies whose object is the amelioration of the condition of the sailor. The San Francisco Port Society was organized in March, 1860, under the auspices of the Seaman's Friend Society of New York, and has been of great service in establishing and sustaining the Mariners' Church of San Francisco. The Ladies' Seamen's Friends Society of the Port of San Francisco originated over fifty years ago in a desire on the part of some of the benevolent ladies of that city to assist in the same good cause.

In the year 1876 the United States, by virtue of the following act of Congress, ceded to the city and county of San Francisco the building known as the old marine hospital, to be used for the purpose of a sailors' home:

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That all the rights and title of the United States to the following-described property is hereby relinquished to the city and county of San Francisco, the same being the two fifty-vara lots on which the old United States marine hospital building now stands, fronting 275 feet on north side of Harrison street, between Spear and Main streets, with a uniform width of 137.6 feet, as laid down on the official map of said city, and to be used by said city and county of San Francisco solely for the purpose of a sailor's home: *Provided*, If the same shall at any time be used for any other than the purpose aforesaid, or if said home shall not be opened within one year from the passage of this act, in such case all right and title hereby relinquished shall revert and again vest in the United States.

On the 2d day of November, 1885, the above-described premises were duly leased to the Ladies' Seamen's Friend Society for the purpose of a sailors' home for a term of three years. This institution, under the direction of a board of lady managers, has been carried on with considerable success since that date, and is said to have been the means of aiding and reforming numerous seafaring men. According to the late annual report of the superintendent, the total number of seamen regis-

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tered during the year was 1,697, and the amount of money deposited by sailors for safe-keeping was $10,400, of which $10,215 had been withdrawn or sent to their friends.

Charges of mismanagement have been preferred, but these have been promptly referred to committees for investigation, which have reported that the charges were not sustained, and that any change in the management of the home would be unwise.

There is a chaplain attached to the institution, Rev. E. A. Ludwick, and services are regularly held in different languages.

At Portland, Oreg., a mariners' home was built by subscriptions from persons who were interested in the welfare of seamen, and was formally opened May 9, 1882. The home will accommodate eighty boarders, and, in connection with the Bethel, which was opened some few years previously, seems to have been successful from the start. The report for 1882 of the chaplain and superintendent, R. S. Stubbs, says that over 13,000 persons had attended the Bethel during the year, and 999 persons had availed themselves of the home as a boarding-house, many of whom were furnished with berths on ships, both officers and seamen. The chaplain had received as deposits wages amounting to $10,392 from seamen, fishermen, and longshoremen, of which $1,606 was sent to relatives of depositors in the States and throughout Europe, and $8,546 was returned to the depositors; but the whole amount deposited was really rescued from those numerous enemies of the sailor who lie in wait to prey upon his earnings. It appears that there is no Bethel north of San Francisco except at Portland and Victoria, B. C.; but there is a Seamen's Friend Society at Astoria, of which the Portland, Tacoma, and Seattle Seamen's Friend Societies are auxiliaries. Chaplain Stubbs says, in conclusion, that the work in its effectiveness affords a cheering percentage of results, and but for the sailor boarding people, the runners, and crimps, and venal shipmasters, who wink at their nefarious spoliation of seamen to gratify their own greed, much larger results would be reported. Poor Jack is still robbed, abused, and degraded shamefully and on every hand, the Dingley bill is evaded, and owners and seamen are defrauded almost every day in the year.

For four years nearly I was the superintendent and lessee of the home, also the chaplain of the Bethel, and its shipping agent, and I know that the iniquities of which I speak beggar description, and poor Jack is invariably the victim—frequently the owners and frequently both. And "blood-money" is still extorted and oftentimes divided between the boarding-house men and the captains. Of this I speak advisedly.

In the department of the Northern Lakes there is the Western Seamen's Friend Society, which was organized over fifty years ago, and has been doing important work in improving the moral and sanitary condition of seamen.

At Chicago, which is the headquarters of the superintendent of the society, there was established in 1871 a sailors' home or mariners' house under its direction. The house was destroyed by the great fire of that year, but a new one was erected and opened in the spring of 1872. The house is under the superintendence of Mr. B. Frankland, and is intended as a stopping-place for seafaring men. It is conducted under temperance auspices, and the aim is to elevate the men socially and morally. There is also at Chicago a chapel devoted to the use of seamen, where meetings are held for nine months of the year.

At Cleveland, Ohio, there is a home connected with the Bethel for the worship of seamen, though but few are said to attend now. There is also an incorporated undenominational Bethel known as the Floating Bethel and City Mission Chapel. The chaplain is a one-armed man,

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who spent seventeen years of his life as a sailor, and for the past nineteen years has labored in this port as sailors' missionary. He is an ordained sailors' evangelist of the Presbyterian Church. His work is supported by all of the different churches in Cleveland. Their meetings are attended by more sailors than any Bethel on the Western lakes. Connected with their chapel is a free reading-room, which opens on the dock in the center of the shipping. They also employ a sailors' missionary who, with the chaplain, visits every week the sailors' department of the city hospital (formerly the marine). The chaplain's name is John D. Jones.

Detroit, Mich., has a mariners' free church, which was the bequest of a devout lady resident of the city some thirty years ago. She provided in her will a handsome property for its maintenance, and directed that the control be vested in the Episcopal Church, through the bishop and officers of the diocese. The Rev. Paul Zeigler is now the officiating rector.

At the port of Buffalo, N. Y., there is a church set apart for the use of seamen called the Wells Street Mission, of which the Rev. P. G. Cook is chaplain.

These are some of the results of efforts long persisted in to improve the sailor; but seamen are still thrown by necessity into the hands of boarding-house keepers, whose runners infest the incoming ship, in the hope of securing lodgers, when crews are paid off. Any person at all familiar with seafaring life knows what hard places the generality of sailor boarding-houses are; but the sailors must go there, as a rule, because no other or more respectable places are provided for the great majority of them.

Regarding the sailor as an important factor in the commerce of the age, it would seem but proper that a Government that has sought by wise and humane legislation to protect his health while at sea and save his earnings while on shore, should be interested in providing him with a home supplied with the comforts of civilization, which his peculiarly defenseless condition leaves him so often without.

PAYMENTS TO REVENUE-MARINE SERVICE FOR TRANSPORTATION OF SEAMEN FROM THE ARCTIC REGIONS.

In several instances whaling and other vessels of the United States have been wrecked in Arctic regions, and the crews have been brought therefrom in United States revenue cutters. No appropriation exists for reimbursing the revenue marine fund for the expense incurred in furnishing subsistence to the shipwrecked men. It seems just that said fund should be recompensed, and it is therefore suggested that Congress might properly provide for the payment in such cases for the transportation of shipwrecked seamen in United States revenue cutters from the Arctic regions to the credit of the revenue marine fund, the same compensation that is now authorized to be paid to masters of vessels of the United States for the transportation of destitute seamen in such vessels to the United States, under section 4578, Revised Statutes, as amended.

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OFFICERS OF MERCHANT VESSELS.

Whatever may be said of our seamen, there is always much that may be said in favor of the officers in our merchant service.

There is, perhaps, no more responsible or trying position than that of master of one of our large ships or steamers, and more especially when, as is sometimes the case, they start on a voyage in a poorly-furnished and half-manned vessel, without ever having seen one of the crew, and with strangers for officers. Knowing that his employers look upon him to make a quick voyage, and his underwriters expect a safe one, his pathway for the next twenty or sometimes a hundred days is by no means strewn with roses. But he naturally expects his officers to share a portion of his responsibilities. They must insure the safety of the lives and property under his charge by a strict enforcement of obedience to orders on the part of the crew, and it is a wonder, rather than otherwise, that under such circumstances our ships get along with so little trouble and make the successful voyages that they do.

There are as yet no requirements as to competency of our officers in the merchant service, and hitherto such exaction has not been found absolutely necessary, the American marine having stood at the top of the list in this regard, so long as our ships continued to be officered by Americans. Of late years, however, numbers of foreigners find employment as officers of American ships, irresponsible persons, some of them driven out of the English service by being deprived of their certificates of competency for various offenses or misdemeanors, so that, as a matter of self-defense, we may be considered as duty bound to adopt some system whereby we may get rid of this bad element.

It is certain that the British and other foreign mercantile services are being greatly elevated by means of the certificate system, and there seems to be good reason to believe that ours might be improved by the same eliminating process. Our service has not, it is thought, kept up in all respects with the rapid changes and demands of the times.

The requirements for officers of steamers, if not so technical, are at least more varied, and call for a different preparation in order to attain competency therein. It has been remarked of the English service that the advance made in almost every branch of human knowledge during the present century has not been fully participated in by the present generation of officers of the merchant marine. Of our service this may still more truthfully be remarked, for, although the officers of our ships of twenty-five years ago were the peer of any afloat, they have not, it is feared, kept pace with the remarkable progress of later years.

The demands in respect to officers are not the same in all kinds of ships and in every trade, and it would seem to be appropriate to divide our merchant marine into several classes, for each of which an examination somewhat different should be exacted, as follows:

(1) Coasting vessels.

(2) Freighting vessels in the foreign trade.

(3) Mail and passenger steamers in foreign trade.

Each of these classes performs a separate work, and the men required to take charge of the vessels might be separated into classes as demanded by different trades. In classes 1 and 2 the test now employed in the English service might be adopted, but for class 3 it is thought a higher grade of examination should be required.

Some system of certifying American officers will doubtless be sooner or later adopted, as it is one of the material safeguards of a great ocean commerce.

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Certificates of competency are to all intents and purposes a guarantee to the ship-owner of good faith on the part of his employè, and an assurance to those passengers who trust their lives to the master's keeping that they may do so with confidence.

These certificates also act as a deterrent on wrong doers, by causing those who are inclined to malpractice to pause; a small warning voice is within the folds of that piece of parchment that might not otherwise be regarded. Certificating officers tends to promote habits of temperance, for without certificates of sobriety and good conduct no candidate should be permitted to enter upon an examination.

The education of the seafaring population has for many years been a subject of care and attention by most governments of maritime nations. So early as the year 1476, when the Italian republics were in the zenith of their commercial power, there was established at Venice an institution called the *Scuola di San Nicola*, which had a celebrated history and became a kind of model for subsequent nautical schools to pattern after. About the year 1786, the laws governing this excellent institution were revised, requiring all seamen employed in the Venetian merchant marine to inscribe their names in the *Scuola di San Nicola*. Foreigners who had served in the merchant ships of Venice five years were entitled to the benefits of the institution. The law of the Venetian Republic of 1786 was preserved with all the rules relative to the institution through the Austrian occupation, and by a decree of 1811 its endowment was considerably augmented. Percentages on prizes and the proceeds of wrecked ships were carried to the fund, which continued to increase. The capital thus accrued was invested in the public funds, and a pension for invalid seamen paid.

The Austrians follow up the example set by Venice, and now require an educational test of candidates to command vessels in the merchant service, besides which they must show that the general conduct has been good. The examination is held before a commission, consisting of an officer of the Government who has charge of matters relating to navigation, the professor of mathematics attached to the naval academy, the captain of the port, one member from the chamber of commerce, and two experienced merchant captains. Candidates are given a certain time in which to answer theoretical and practical nautical questions, to solve such problems as are required, and have to show that they are familiar with maritime laws and customs and the rules of discipline in the merchant service.

In France liberal provision is now made for the proper education of the seafaring classes, which is probably more effective than in any other country. In each maritime arrondissement resides a professor paid by the Government, whose business it is to afford to all officers seeking to be commanders in the merchant marine instruction free of charge on all those subjects which a first-class captain should be acquainted with. The system of combining the preparation and employment of the naval and mercantile services has been most successful in France; they are inscribed on the same rolls and enjoy the same pension when old and invalid.

In Norway and Sweden and Denmark the system of education for the higher grades of the merchant service is said to be very strict and exacting. Mates of vessels have to undergo an examination embracing seamanship, navigation, and a general knowledge of business transactions; accuracy in keeping a log, and an acquaintance with the use of the sextant, compass, and other nautical instruments. The applicant is required to give the definition of such terms as *horizon, zenith, polar*

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distances, right ascension, altitude, parallax radius, and all similar words relating to navigation, and to understand the methods of calculating the time of the tides and the variation of the compass by means of one or more bearings in the horizon and by the azimuth.

Masters of vessels in those countries must have made two voyages at least in the capacity of mate, and they must show themselves to be proficient in a knowledge of maritime and international law and the customs regarding averages, exchanges, and foreign currencies, as also some knowledge of the elements of ship-building and the methods of measurement for tonnage.

Even Russia has exacted certain requirements of the men who take charge of ships in the merchant navy. As early as 1806 a school was founded at Nicholaif, on the Black Sea, for the purpose of training masters and pilots of the commercial marine, which was subsequently enlarged and removed to Kherson. In the year 1832 a similar school was founded at St. Petersburg, and all captains in the Russian merchant service must now bring a certificate of competency from one of these schools.

Great Britain, although the greatest maritime nation of the world, was behind the countries named in establishing examinations of officers with certificates of competency for command in the merchant service. The standard of the service as a consequence begun to run down in comparison with those of other countries. In 1854 there was incorporated in the new merchant shipping act of that year a provision establishing a board of examiners and making examinations of officers of all grades compulsory in the merchant navy.

The following are the regulations in full as to qualifications of officers in the British service under the act referred to:

QUALIFICATIONS FOR CERTIFICATES OF COMPETENCY FOR "FOREIGN-GOING SHIP."

(*a*) A second mate must be seventeen years of age, and must have been four years at sea.

In navigation.—He must write a legible hand and understand the four first rules of arithmetic and the use of logarithms. He must be able to correct the courses steered for variation and leeway, and find the difference of latitude and longitude therefrom; be able to correct the sun's declination for longitude, and find his latitude by meridian altitude of the sun, and work such other easy problems of a like nature as may be put to him. He must understand the use of the sextant, and be able to observe with it and read off the arc.

In seamanship.—He must give satisfactory answers as to the rigging and unrigging of ships, stowing of holds, &c.; must understand the measurement of the log-line, glass, and lead-line; be conversant with the rule of the road as regards both steamers and sailing vessels, and the lights carried by them.

(*b*) An only mate must be eighteen years of age, and have been four years at sea.

In navigation.—In addition to the qualification required for a second mate, an only mate must be able to work a day's work complete, including the bearings and distance of the port he is bound to, by Mercator's method; he must be able to observe and calculate the amplitude of the sun and deduce the variation of the compass therefrom; he must know how to lay off the place of the ship on the chart, both by bearings of known objects and by latitude and longitude; he must be able to use a sextant and determine its error and adjust it, and find the time of high water from the known time at full and change.

In seamanship.—In addition to what is required for a second mate, he must know how to moor and unmoor, and to keep a clear anchor; to carry out an anchor; to stow a hold; and to make the requisite entries in a ship's log.

(*c*) A first mate must be nineteen years of age, and have served five years at sea, of which one year must have been as either second or only mate, or both. Service in a superior capacity is in all cases to be equivalent to service in an inferior capacity.

In navigation.—In addition to the qualification required for an only mate, he must be able to observe azimuths and compute the variation; to compare chronometers and keep their rates, and find the longitude by them from an observation by the sun;

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to work the latitude by single altitude of the sun off the meridian, and be able to use and adjust the sextant by the sun.

In seamanship.—In addition to the qualication required for an only mate, a more extensive knowledge of seamanship will be required as to shifting large spars and sails, managing a ship in stormy weather, taking in and making sail, shifting yards and masts, &c., and getting cargo in and out; getting heavy spars and weights, anchors, &c., in and out; casting a ship on a lee-shore, and securing the masts in the event of accident to the bowsprit.

(*d*) A master must be twenty-one years of age, and have been six years at sea, of which one year must have been as first or only mate, and one year as second mate, or two years as first and only mate. Service in a superior capacity is in all cases to be equivalent to service in an inferior capacity.

In addition to the qualification for a first mate, he must be able to find the latitude by a star, &c. He will be asked questions as to the nature of the attraction of the ship's iron upon the compass, and as to the method of determining it. He must possess a sufficient knowledge of what he is required to do by law, as to entry and discharge and the management of his crew, as to penalties and entries to be made in the official log. He will be questioned as to his knowledge of invoices, charter-party, Lloyd's agent, and as to nature of bottomry; and he must be acquainted with the leading lights of the channel he has been accustomed to navigate or which he is going to use.

In cases where an applicant for a certificate as master ordinary has only served in a fore-and-aft-rigged vessel, and is ignorant of the management of a square-rigged vessel, he may obtain a certificate on which the words "fore-and-aft-rigged vessel" will be written. This is not, however, to apply to mates, who, being younger men, are expected for the future to learn their business completely.

(*e*) An extra master's examination is intended for such persons as wish to prove their superior qualifications. Before being examined for an extra master's certificate an applicant must have served one year, either as a master with an ordinary certificate of competency, or as a master having a first-class certificate granted by one of the former boards of examiners.

In navigation.—As the vessels which such masters will command frequently make long voyages, to the East Indies, the Pacific, &c., the candidate will be required to work a lunar observation, by both sun and star, to determine the latitude by the moon and star, by polar star off the meridian, and also by double altitude of the sun, and to verify the result by Sumner's method. He must be able to calculate the altitudes of the sun or star, when they cannot be observed, for the purposes of lunars to find the error of a watch by the method of equal altitudes, and to correct the altitudes observed with an artificial horizon.

He must understand how to observe and apply the deviation of the compass, and to deduce the set and rate of the current from the dead reckoning and observation. He will be required to explain the nature of great circle sailing, and know how to apply practically that knowledge; but he will not be required to go into the calculations. He must be acquainted with the law of storms, so far as to know how he may probably escape those tempests common to the East and West Indies, and known as hurricanes.

In seamanship.—The extra examination will consist of an inquiry into the competency of the party to heave a ship down, in case of accident befalling her abroad; to get lower masts and other heavy weights in and out; how to construct rafts, and as to his resources for the preservation of the ship's crew in the event of wreck and in such operations of a like nature as the examiner may consider necessary.

QUALIFICATIONS FOR CERTIFICATES OF COMPETENCY FOR HOME-TRADE PASSENGER SHIPS.

(*a*) A mate must write a legible hand and understand the first four rules of arithmetic. He must know and understand the rule of the road, and describe and show that he understands the admiralty regulations as to lights. He must be able to take a bearing by compass, and prick off the ship's course on a chart. He must know the marks in the lead-line and be able to work and heave the log.

(*b*) A master must have served one year as a mate in the foreign or home trade. In addition to the qualifications required for a mate, he must show that he is capable of navigating a ship along any coast, for which purpose he will be required to draw upon a chart produced by the examiner the courses and distances he would run along shore from headland to headland, and to give, in writing, the courses and distances, corrected for variation, and the bearings of the headlands and lights, and when the courses should be altered either to clear any dangers or to adapt it to the coast. He must understand how to make his surroundings according to the state of the tide.

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EXAMINATIONS IN STEAM.

Arrangements have been made for giving to those masters, or first, or only mates, who possess certificates of competency, or who may apply for such certificates, and who desire it, an opportunity of undergoing an examination as to their practical knowledge of the use and working of the steam-engine. These examinations will be conducted under the superintendence of the local marine boards, at such times as they may appoint for the purpose; and the examiners will be selected by the board of trade from the engineer surveyors appointed under the act. The examination will not comprise intricate theoretical questions, but will be such as to satisfy the examiner that the applicant is competent to control the working of the engine, and has such a knowledge of the ordinary parts of the machinery as will enable him to judge of the nature of an accident, and, in the absence of the engineer, to give the necessary directions in the engine-room. The practice will be as follows: The applicant must deliver to the shipping-master a statement in writing to the effect that he wishes to be examined in steam. If he is about to pass an examination in navigation, the statement must be on or annexed to a form prepared for that purpose; if the applicant has a certificate of competency, the statement must be delivered to the shipping-master with his certificate, so that due notice may be given to the examiner, and so that the board of trade on receiving it may have the means of indorsing on his certificate, and recording the fact that he has "passed in steam." He must also, at the same time, pay a fee of £1, which will be applied in remunerating the examiners. Notice will be given of the time at which the applicant is to attend to be examined, and if he passes, the result of the examination will be reported to the board of trade, and his certificate of competency will be issued or returned to him, as the case may be, with an indorsement, as above mentioned, showing that he has "passed in steam." If he fails, no notice of the failure will be recorded on the certificate, but no part of the fee will be returned.

Full directions as to the course of examination in steam and the qualifications required of candidates are contained in the instructions issued to engineer surveyors appointed as examiners at the larger ports.

GENERAL RULES AS TO EXAMINATIONS AND FEES.

The candidates will be allowed to work out the various problems according to the method and tables they have been accustomed to use, and will be allowed five hours to perform the work; at the expiration of which, if they have not finished, they will be declared to have failed, unless the local marine board see fit to extend the time.

FEES PAID BY APPLICANTS FOR EXAMINATION.

The fee for examination must be paid to the shipping-master. If a candidate fail in his examination, half the fee he has paid will be returned to him by the shipping-master, on his producing a document which will be given him by the examiner. The fees are as follows:

	£	s.	d.
For foreign-going ships:			
Second mate	1	0	0
First and only mate, if previously possessing an inferior certificate	0	10	0
If not	1	0	0
Master, whether extra or ordinary	2	0	0
For home-trade passenger ships:			
Mate	0	10	0
Master	1	0	0

Any one who has been one year in possession of a master's first-class certificate granted by one of the former boards of examiners, or of an ordinary master's certificate of competency granted under the present examiners, may pass an extra examination, and receive an extra certificate in exchange for his former one, without payment of any fee; but if he fails in his first examination he must pay half a master's fee on his coming a second time; and the same sum for every subsequent attempt.

If the applicant passes he will receive a document from the examiner, which will entitle him to receive his certificate of competency from the shipping-master at the port to which he has directed it to be forwarded. If his testimonials have been sent to the registrar to be verified, they will be returned with his certificate.

If an applicant is examined for a higher rank and fails, but passes an examination of a lower grade, he may receive a certificate accordingly, but no part of the fee will be returned.

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In all cases of complete failure the candidate must be re-examined *de novo*, and in case of failure in seamanship, a candidate will not be examined until after a lapse of six months, to give him time to gain experience.

As the examinations of masters and mates are made compulsory, the qualifications have been kept as low as possible; but it is understood that it is the intention of the board of trade to raise the standard from time to time, whenever, it no doubt will be the case, the general attainments of officers in the merchant service shall render it possible to do so without inconvenience; and officers are strongly urged to employ their leisure hours when in port, in the acquirement of the knowledge necessary to enable them to pass their examinations; and masters will do well to permit apprentices and junior officers to attend schools of instruction, and to afford them as much time for this purpose as possible.

It will be seen that the examinations for the different grades of officers in the English service are mainly technical, and as at present conducted it is said to be customary for candidates to "coach up" for them in a few weeks spent on shore in careful study. The practice is, after an applicant has passed his four years' service *at sea* (harbor service of a certain description is not admissible) he enters on a kind of cramming course in one of the many marine schools established for that purpose, and in the term of three or four weeks he is prepared to undergo an examination such as is required by the British Board of Trade.

At these examinations he has placed before him a series of set questions to elucidate his abilities as a navigator. If those are worked out satisfactorily, and all questions answered with correctness and promptness, he becomes the possessor of a certificate.

The examination is thought to be quite stringent enough in those matters relating to seamanship and practical navigation; they do not include a sufficient test as to general education, nor are the rules of examination designed to bring out the candidate's proficiency in scientific matters relating to all the technical branches in which he may be called upon to exercise a more than mere practical knowledge.

"General education," said a distinguished English professor, "should aim at causing a man to form an intelligent opinion with regard to the ordinary affairs of life, and be full of resources for meeting new emergencies. Technical education should aim at enabling him to understand the process and the machinery of the special work in which he is engaged. Indeed, a thorough education, together with a special training for some particular employment, is becoming more necessary every year."

But it is said even a master's certificate, which is the highest granted by the British Board of Trade, does not carry with it any assurance that the holder has even a superficial knowledge of the rules of English grammar, or any of the rudimentary foundation for a general education.

As regards technical knowledge they may be still more deficient, and candidates are not examined except voluntarily as to their practical acquaintance with the working of the steam-engine so as to thoroughly understand the various wants of their engineer officers.

An officer's certificate should be a sort of mirror reflecting the possession, abilities, and fitness in the different branches of his calling, and in fact a reflection of his proficiency in all the degrees of his varied avocation. The British system of certificating officers fails to do this, but testifies rather that all men are endowed alike. This is fallacious and leads to a mistaken view as to the holder's actual ability in any particular branch, or fitness for any particular duty. There are some nations of continental Europe who impose, as one of the conditions of fitness for examination, that a candidate shall undergo a six months' course of training in a nautical school prior to his being examined for a certificate.

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This of itself is an excellent rule, and while it is a very superficial preparation for so responsible a duty, it brings into prominence the apt scholar, who gains a meritorious certificate. Upon the certificate granted by those nations are grades illustrating the possessor's proficiency in the different sections of his calling. Marks are allowed for aptitude in reading, writing, arithmetic, geometry, trigonometry, nautical astronomy, magnetism, construction of hull, masts, sails, and rigging and handling of vessels.

The British system of granting certificates of competency is condemned by at least one of their marine instructors* as "misleading," and a process which would dissect, as it were, the candidate's real abilities, is recommended in its place. Owners and masters not acquainted with their employés might have reason to distrust a new officer in certain sections of his calling, but when vouched for as stated above, even a stranger might be accepted with some degree of confidence. The examination of a candidate by a series of set questions is an unjust test. Examiners should not be restricted as to the number of questions or the kind of problems, but permitted to elucidate the candidate's fitness to hold the certificate he seeks by their own test, and such test should not admit of a lax principle, but consist in a rigid, operative, and exacting nature, sounding the depths of a candidate's knowledge. Superficial acquirements would by such a process be soon ascertained, and the candidate would thus be stimulated to a fuller and more complete preparation for the duties of his profession.

HOUSE FLAGS AND SIGNALS.

In conformity with a letter of the Secretary of the Treasury, addressed to Mr. William F. Coston, New York, under date of October 4, 1883, there was established in the Revenue Marine Bureau of the Department "a registry of house flags, night signals, and funnel marks of American vessels and foreign steamship lines which touch at ports of the United States and adjacent countries." According to two subsequent letters of the Assistant Secretaries Fairchild and Smith the continuance of the work was ordered with an increased scope, and its direction placed under the Commissioner of Navigation.

The books and papers connected with the work referred to were, ac cording to the directions contained in the letters cited, duly transferred to this Bureau, and in order to render the result as complete and valuable to those interested in such matters as practicable, I have engaged in correspondence with shipping firms in this country and the agents of steamship lines in other countries, and many valuable data have been obtained relating to the number of steamers running on various routes, their dates of sailing, &c., which, however, without the means of publication, remain comparatively useless. As a knowledge of the various flags, signals, and funnel marks would be of considerable value to seamen, as well as to the traveling population in general, I would suggest that the requisite funds for the publication of the work be provided.

It is now two and a half years since the Bureau of Navigation was established, and it may be said to have been organized and operated as the spirit of the law creating it designed, and the progress already made affords me pleasure in stating that not only was the bureau needed, but that the legislation and regulations by which it is governed show

* F. Langdon, of Bristol.

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plainly that it is abreast of the important interests it was created to promote and advance.

The usefulness of the Bureau will, it is thought, be still further demonstrated as our mercantile marine and carrying trade become more prosperous and our seamen more numerous, which I doubt not will be the case when the effects of the recent beneficial legislation have had sufficient time to make themselves felt, and the cloud of depression that has so long enveloped the shipping business is dissipated.

Deeply sensible of your co-operation in effecting what has been accomplished, and with a just appreciation of the valuable services of those engaged in the official work of the Bureau,

I am, sir, very respectfully, yours,

JARVIS PATTEN,
Commissioner of Navigation.

Hon. DANIEL MANNING,
Secretary of the Treasury.

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No. 1.—*Statement showing the Number and Tonnage of* **REGISTERED, ENROLLED,** *and* **LICENSED VESSELS** *of the United States, June 30,* **1886.**

STATES AND CUSTOMS DISTRICTS IN WHICH DOCUMENTED.	REGISTERED.				ENROLLED.				LICENSED.		TOTAL.	
	PERMANENTLY.		TEMPORARILY.		PERMANENTLY.		TEMPORARILY.		UNDER 20 TONS.			
	No.	Tons.	No.	Tons.	No.	Tons.	No.	Tons.	No.	Tons.	No.	Tons.
THE ATLANTIC AND GULF COASTS.												
MAINE.												
Passamaquoddy	21	3,498.91	2	484.23	104	13,413.06	2	205.27	44	651.14	173	18,252.61
Machias	38	8,557.44	4	1,041.24	108	7,767.19	.....	.....	35	520.14	185	17,886.01
Frenchman's Bay	4	1,388.92	2	470.14	188	13,315.88	3	281.96	44	515.61	241	16,002.53
Castine	1	602.38	.....	.....	173	11,557.14	3	204.81	57	714.51	234	13,078.84
Bangor	7	3,143.38	2	1,018.23	186	16,201.69	4	926.70	12	145.57	161	21,435.57
Belfast	23	22,285.06	1	182.07	157	16,660.43	3	1,695.15	48	531.82	232	41,354.53
Waldoborough	32	37,717.57	4	4,415.40	223	27,271.84	.....	.....	80	967.24	339	70,372.05
Wiscasset	1	1,526.60	2	710.47	72	4,268.09	5	353.41	61	758.62	141	7,617.19
Bath	59	89,922.02	8	10,661.84	125	35,784.08	8	4,632.68	59	913.08	259	141,913.70
Portland and Falmouth	89	67,206.74	20	8,901.44	175	24,729.77	9	3,850.78	72	1,116.82	365	105,805.55
Saco	1	696.98	1	149.77	11	1,292.76	.....	.....	6	51.19	19	2,190.70
Kennebunk	.....	.....	1	1,921.56	21	1,366.63	.....	.....	10	108.37	32	3,396.56
York	.....	.....	.....	.....	6	261.12	.....	.....	4	48.55	10	329.67
Total	276	236,546.00	47	29,950.39	1,499	173,909.68	37	11,650.78	532	7,072.66	2,391	459,138.51
NEW HAMPSHIRE.												
Portsmouth	4	4,484.13	1	266.22	45	5,426.82	.....	.....	15	244.80	65	10,421.97
MASSACHUSETTS.												
Newburyport	5	5,540.73	9	7,790.52	27	2,929.58	.....	.....	23	304.67	64	16,565.50
Gloucester	6	392.96	1	92.13	419	31,382.57	1	500.98	67	879.58	494	33,228.22
Salem and Beverly	.....	.....	1	187.35	16	890.60	2	976.94	20	263.63	39	2,318.52
Marblehead	1	162.91	.....	.....	25	2,495.25	1	70.94	13	137.14	40	2,866.24
Boston and Charlestown	182	122,022.82	50	23,212.14	369	94,060.14	51	23,225.27	47	966.91	699	263,487.28
Plymouth	2	147.35	.....	.....	16	1,410.02	.....	.....	13	142.98	31	1,700.35
Barnstable	14	1,444.54	.....	.....	229	26,606.98	1	84.79	63	772.08	307	28,908.39
Nantucket	.....	.....	.....	.....	5	964.71	.....	.....	11	76.22	16	1,040.93
Edgartown	2	408.50	.....	.....	6	424.87	.....	.....	12	148.47	20	981.84

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New Bedford	36	23,698.33	5	1,024.84	56	9,974.12	1	620.94	54	614.79	202	35,928.07
Fall River	1	558.34	.....	.....	83	48,766.95	2	446.53	14	173.80	80	49,945.12
Total	299	154,871.53	66	31,306.96	1,250	219,885.29	59	25,926.39	337	4,479.77	2,011	435,969.96
RHODE ISLAND.												
Providence	1	359.67	1	108.58	68	28,033.50	5	3,209.71	56	577.40	131	33,288.86
Bristol and Warren	1	106.45	.....	.....	8	1,057.59	1	92.68	20	196.78	30	1,453.45
Newport	.....	.....	.....	.....	43	4,655.50	.....	.....	61	712.46	104	5,967.96
Total	2	466.12	1	108.58	119	33,746.59	6	3,302.34	137	1,486.64	265	39,110.27
CONNECTICUT.												
Stonington	2	137.13	.....	.....	45	4,754.15	1	988.18	57	568.69	105	6,448.15
New London	5	605.96	.....	.....	114	30,230.14	5	987.24	48	694.59	172	32,467.98
Middletown	.....	.....	.....	.....	79	13,566.00	1	226.84	15	295.25	95	14,088.09
New Haven	4	933.59	.....	.....	220	43,669.98	.....	.....	51	726.92	275	45,330.49
Fairfield	.....	.....	.....	.....	78	10,534.34	.....	.....	95	1,042.25	173	11,576.59
Total	11	1,676.68	.....	.....	536	102,754.61	7	2,152.26	266	3,327.70	820	109,911.25
NEW YORK.												
New York	291	263,317.34	132	100,279.13	2,494	490,777.72	155	51,998.45	883	12,291.08	3,955	918,663.72
Sag Harbor	.....	.....	1	49.65	102	12,432.04	3	197.10	126	1,242.53	232	13,921.32
Total	291	263,317.34	133	100,328.78	2,596	503,209.76	158	52,195.55	1,009	13,533.61	4,187	932,585.04
NEW JERSEY.												
Newark	.....	.....	.....	.....	50	5,068.69	6	1,356.91	15	323.08	71	6,768.68
Perth Amboy	.....	.....	.....	.....	200	33,787.38	5	920.97	172	1,767.20	377	36,475.55
Little Egg Harbor	.....	.....	.....	.....	26	3,737.19	1	41.81	26	348.82	53	4,127.52
Great Egg Harbor	.....	.....	.....	.....	85	16,024.82	1	162.59	47	600.06	133	16,787.47
Bridgeton	.....	.....	.....	.....	189	17,273.87	2	47.09	240	2,959.25	431	20,280.21
Burlington	.....	.....	.....	.....	29	3,319.45	.....	.....	14	258.13	43	3,577.58
Total	.....	.....	.....	.....	579	79,231.40	15	2,529.37	514	6,256.24	1,108	88,017.01
PENNSYLVANIA.												
Philadelphia	40	34,963.96	33	29,279.58	602	141,459.61	60	22,989.10	134	2,479.30	889	231,121.55
DELAWARE.												
Delaware	.....	.....	1	625.20	136	15,640.50	.....	.....	38	465.49	175	16,731.19
MARYLAND.												
Baltimore	49	16,564.81	19	10,085.25	685	84,829.81	17	5,083.00	462	5,815.49	1,232	122,338.36
Annapolis	.....	.....	.....	.....	49	1,976.92	.....	.....	81	960.86	130	2,937.78
Eastern Maryland	.....	.....	.....	.....	330	13,395.17	.....	.....	541	6,220.07	871	19,615.24
Total	49	16,564.81	19	10,085.25	1,064	100,201.90	17	5,083.00	1,084	12,996.42	2,233	144,881.38

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No. 1.—*Statement showing the Number and Tonnage of* **REGISTERED, ENROLLED,** *and* **LICENSED VESSELS** *of the United States, June* 30, **1886**—Continued.

STATES AND CUSTOMS DISTRICTS IN WHICH DOCUMENTED.	REGISTERED.				ENROLLED.				LICENSED.		TOTAL.	
	PERMANENTLY.		TEMPORARILY.		PERMANENTLY.		TEMPORARILY.		UNDER 20 TONS.			
	No.	Tons.	No.	Tons.	No.	Tons.	No.	Tons.	No.	Tons.	No.	Tons.
THE ATLANTIC AND GULF COASTS—Continued.												
DISTRICT OF COLUMBIA.												
Georgetown					36	9,590.91			31	490.86	67	10,081.77
VIRGINIA.												
Alexandria	1	80.64	3	1,252.17	38	2,348.43	2	807.12	32	415.05	76	4,903.41
Tappahannock					76	3,204.70			70	847.78	146	4,052.48
Richmond			3	962.10	36	5,392.11			19	287.17	58	6,641.38
Petersburg					1	45.59	1	128.08	6	81.90	8	255.57
Yorktown					62	2,676.33			151	1,612.27	213	4,288.60
Norfolk and Portsmouth	1	132.73	3	2,900.13	108	9,319.86	1	776.29	312	3,247.94	425	16,376.95
Cherrystone					92	3,178.82			246	2,564.18	338	5,738.00
Total	2	213.37	9	5,114.40	413	26,160.84	4	1,711.49	836	9,056.29	1,264	42,256.39
NORTH CAROLINA.												
Albemarle					18	2,364.21			53	518.78	71	2,882.99
Pamlico					29	1,856.69	1	50.65	84	939.03	114	2,846.37
Beaufort					17	786.87	1	83.22	69	777.58	87	1,597.67
Wilmington	1	334.84	10	2,474.48	25	1,526.15	3	663.62	20	363.73	59	5,362.82
Total	1	334.84	10	2,474.48	89	6,533.92	5	747.49	226	2,599.12	331	12,689.85
SOUTH CAROLINA.												
Georgetown	1	222.96	1	231.26	9	1,217.99	1	102.48	10	164.40	22	1,939.09
Charleston			3	1,149.84	56	5,671.64	2	180.75	99	1,234.47	160	8,236.70
Beaufort					11	706.40	1	532.81	12	210.28	24	1,449.49
Total	1	222.96	4	1,381.10	76	7,596.03	4	816.04	121	1,609.15	206	11,625.28
GEORGIA.												
Savannah	1	342.83	1	442.50	39	22,277.49	9	1,967.45	40	578.94	90	25,560.21

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Brunswick			7	3,406.23	18	1,688.64	2	787.43	10	122.90	37	5,995.22
Saint Mary's			1	521.99	2	56.80	1	333.36			4	917.24
Total	1	342.83	9	4,371.72	59	23,973.02	12	3,063.23	50	711.98	131	32,462.78
FLORIDA.												
Fernandina			7	2,275.01	3	122.89	2	850.45	3	61.02	15	3,309.37
Saint John's	1	14.93	4	795.12	40	3,904.95	6	1,098.96	24	378.83	75	6,192.79
Saint Augustine					2	259.59			6	72.78	8	332.37
Key West	26	3,255.81	4	920.48	20	1,726.98	1	510.38	122	1,437.48	173	7,851.08
Saint Mark's	1	6.97			5	632.36			42	485.71	48	1,125.04
Apalachicola	1	42.69			10	807.29	2	643.87	26	297.62	39	1,851.47
Pensacola	3	1,028.65	11	5,702.76	54	2,948.41	7	2,627.59	58	741.99	133	13,049.40
Total	32	4,349.05	26	9,693.37	134	10,462.42	18	5,731.25	281	3,475.43	491	33,711.53
ALABAMA.												
Mobile	5	725.53	7	2,125.41	68	6,787.85	2	786.96	50	567.29	132	10,993.04
MISSISSIPPI.												
Pearl River	7	1,198.10	4	1,087.44	65	2,708.33	1	41.07	74	927.56	151	5,962.50
LOUISIANA.												
New Orleans	39	19,850.36	10	4,677.32	73	24,851.67	1	374.65	229	2,227.28	352	42,981.28
Teche	1	100.80			36	1,874.44			64	723.66	101	2,698.90
Total	40	19,951.16	10	4,677.32	109	26,726.11	1	374.65	293	2,950.94	453	45,680.18
TEXAS.												
Galveston	2	81.68	3	3,446.45	77	5,810.44			108	1,265.27	190	10,603.84
Saluria					4	136.11			19	166.75	23	302.86
Corpus Christi	1	49.19	1	253.86	12	664.58	1	112.21	18	222.31	33	1,302.15
Brazos de Santiago	9	392.15	2	35.12	1	21.05					12	448.32
Total	12	523.02	6	3,735.43	94	6,632.18	1	112.21	145	1,654.33	258	12,657.17
Total Atlantic and Gulf Coasts	1,073	731,246.43	386	236,620.65	9,569	1,502,632.77	407	139,113.18	6,173	76,375.53	17,608	2,695,988.56
THE PACIFIC COAST.												
CALIFORNIA.												
San Diego	5	97.73							8	105.27	13	203.00
Wilmington					6	334.33			7	84.83	13	919.70
San Francisco	156	67,783.39	32	45,173.90	526	120,355.69	5	8,467.07	114	1,963.72	833	243,413.77
Humboldt	1	314.94	1	293.57	18	2,394.86			6	93.09	26	3,596.46
Total	162	68,196.06	33	45,467.47	550	124,085.43	5	8,467.07	135	1,916.90	885	248,133.93

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No. 1.—*Statement showing the Number and Tonnage of* **REGISTERED, ENROLLED,** *and* **LICENSED VESSELS** *of the United States, June 30,* **1886**—Continued.

STATES AND CUSTOMS DISTRICTS IN WHICH DOCUMENTED.	REGISTERED.				ENROLLED.				LICENSED.		TOTAL.	
	PERMANENTLY.		TEMPORARILY.		PERMANENTLY.		TEMPORARILY.		UNDER 20 TONS.			
	No.	Tons.	No.	Tons.	No.	Tons.	No.	Tons.	No.	Tons.	No.	Tons.
THE PACIFIC COAST—Continued.												
OREGON.												
Southern Oregon					7	613.99			7	169.08	14	783.07
Yaquina					3	1,382.95	1	47.39	2	26.25	6	1,456.59
Oregon			1	56.59	29	2,166.03			38	593.58	68	2,816.20
Willamette	6	5,130.82	1	1,331.83	82	43,366.16	2	1,762.68	12	229.08	103	51,820.57
Total	6	5,130.82	2	1,388.42	121	47,479.13	3	1,810.07	59	997.99	191	56,866.43
WASHINGTON.												
Puget Sound	83	11,374.14	18	10,353.77	47	19,902.36	2	152.50	27	337.60	177	42,120.37
ALASKA.												
Alaska					4	267.08	3	166.59	13	191.36	20	624.98
Total Pacific Coast	251	84,701.02	53	57,999.66	722	191,783.95	18	10,998.28	294	3,448.85	1,378	367,931.71
THE NORTHERN LAKES.												
VERMONT.												
Vermont					31	4,318.77					31	4,318.77
NEW YORK.												
Champlain					724	61,919.27	4	460.66			728	62,379.93
Oswegatchie					37	5,102.93			4	47.99	41	5,150.92
Cape Vincent					50	4,021.53	1	9.03			51	4,030.56
Oswego					128	20,375.52	1	111.83			129	20,487.35
Genesee					18	2,150.83					18	2,150.83
Niagara					18	4,505.58					18	4,505.58
Buffalo Creek					214	106,517.56	1	118.11			215	106,635.67
Dunkirk					2	148.31					2	148.31
Total					1,191	205,251.83	7	699.13	4	47.99	1,202	205,998.45

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PENNSYLVANIA.												
Erie					86	28, 128. 19			1	13. 78	87	28, 141. 97
OHIO.												
Cuyahoga					193	101, 117. 11	1	375. 45			194	101, 492. 56
Sandusky					82	24, 019. 61					82	24, 019. 61
Miami					56	17, 849. 59	1	13. 31			57	17, 862. 90
Total					331	142, 986. 31	2	388. 76			333	143, 375. 07
MICHIGAN.												
Detroit					300	98, 953. 54	5	1, 192. 80			305	100, 146. 34
Huron					353	83, 789. 94	4	2, 502. 31			357	86, 292. 25
Superior					101	15, 788. 92	1	50. 24			102	15, 839. 16
Michigan					309	31, 827. 18	3	48. 50			312	31, 875. 68
Total					1, 063	230, 827. 58	13	3, 793. 85			1, 076	234, 121. 43
ILLINOIS.												
Chicago			2	980. 90	345	64, 609. 58	5	1, 139. 74			352	66, 730. 22
WISCONSIN.												
Milwaukee					351	78, 991. 76	1	60. 56			352	79, 052. 32
MINNESOTA.												
Duluth					22	822. 34					22	822. 34
Total Northern Lakes			2	980. 90	3, 370	755, 435. 86	28	6, 082. 14	5	61. 77	3, 405	762, 560. 57
THE WESTERN RIVERS.												
LOUISIANA.												
New Orleans	3	286. 19	1	134. 28	101	18, 824. 32	5	728. 63	12	422. 24	125	20, 395. 66
MISSISSIPPI.												
Natchez					3	303. 23					3	303. 23
Vicksburg					21	2, 187. 64	3	252. 01	6	115. 86	30	2, 555. 51
Total					24	2, 490. 87	3	252. 01	6	115. 86	33	2, 858. 74
TENNESSEE.												
Memphis					68	13, 713. 38			2	61. 60	70	13, 774. 98
Nashville					16	3, 705. 59	1	358. 31	2	24. 55	19	4, 088. 45
Chattanooga					15	2, 665. 32					15	2, 665. 32
Total					99	20, 084. 29	1	358. 31	4	86. 15	104	20, 528. 75

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No. 1.—*Statement showing the Number and Tonnage of* **REGISTERED, ENROLLED,** *and* **LICENSED VESSELS** *of the United States, June* 30, **1886**—Continued.

STATES AND CUSTOMS DISTRICTS IN WHICH DOCUMENTED.	REGISTERED.				ENROLLED.				LICENSED.		TOTAL.	
	PERMANENTLY.		TEMPORARILY.		PERMANENTLY.		TEMPORARILY.		UNDER 20 TONS.			
	No.	Tons.	No.	Tons.	No.	Tons.	No.	Tons.	No.	Tons.	No.	Tons.
THE WESTERN RIVERS—Continued.												
KENTUCKY.												
Paducah					22	3,480.69			1	15.55	23	3,496.24
Louisville					53	14,578.37	1	381.63	3	37.73	57	14,997.73
Total					75	18,059.06	1	381.63	4	53.28	80	18,493.97
MISSOURI.												
Saint Louis					231	155,600.02	7	5,439.12	14	238.40	252	161,478.54
Kansas City					12	1,155.81			2	29.54	14	1,185.35
Saint Joseph					4	687.55					4	687.55
Total					247	157,649.38	7	5,439.12	16	282.94	270	163,351.44
NEBRASKA.												
Omaha					20	3,610.51			2	26.05	22	3,636.56
IOWA.												
Burlington					49	5,250.75					49	5,250.75
Dubuque					23	4,547.21			1	17.68	24	4,564.89
Total					72	9,797.96			1	17.68	73	9,815.64
MINNESOTA.												
Minnesota					55	7,720.89	2	257.61	2	31.65	59	8,010.15
WISCONSIN.												
La Crosse					39	3,849.40			2	33.85	41	3,883.25
ILLINOIS.												
Galena					23	2,370.01			1	7.80	24	2,377.81

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INDIANA.												
Evansville					55	8,196.62					55	8,196.62
OHIO.												
Cincinnati					100	30,999.26	1	520.36	5	74.41	106	31,594.03
WEST VIRGINIA.												
Wheeling					95	10,231.50	1	156.40	5	87.55	101	10,475.45
PENNSYLVANIA.												
Pittsburgh					148	31,488.25			7	93.67	155	31,581.92
Total Western Rivers	3	286.19	1	134.28	1,153	325,074.32	21	8,094.07	70	1,313.13	1,248	334,901.99

SUMMARY.

Atlantic and Gulf Coasts	1,073	731,246.43	386	236,620.65	9,569	1,502,632.77	407	139,118.18	6,173	76,375.53	17,608	2,685,988.56
Pacific Coast	251	84,701.02	53	57,209.66	722	191,733.95	13	10,596.23	234	3,413.85	1,273	347,684.71
Northern Lakes			2	980.90	3,370	755,435.86	28	6,082.04	5	61.77	3,405	762,560.57
Western Rivers	3	286.19	1	134.28	1,153	325,074.32	21	8,094.07	70	1,313.13	1,248	334,901.99
Grand total	1,327	816,233.64	442	294,945.49	14,814	2,774,876.90	469	163,885.52	6,482	81,194.28	23,534	4,131,135.83

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No. 2.—*Statement showing, by States and Territories, the Number and Tonnage of* **REGISTERED, ENROLLED,** *and* **LICENSED VESSELS** *of the United States, June 30,* **1886.**

STATES AND TERRITORIES IN WHICH DOCUMENTED.	REGISTERED.		ENROLLED.		LICENSED.		TOTAL.	
	No.	Tons.	No.	Tons.	No.	Tons.	No.	Tons.
Maine	323	206,505.39	1,536	185,590.46	532	7,072.66	2,391	459,138.51
New Hampshire	5	4,750.85	45	5,426.82	15	244.80	65	10,421.97
Vermont			31	4,318.77			31	4,318.77
Massachusetts	365	185,678.51	1,309	245,811.68	337	4,479.77	2,011	435,969.96
Rhode Island	3	574.70	125	37,048.93	137	1,486.64	265	39,110.27
Connecticut	11	1,676.68	543	104,906.87	266	3,327.70	820	109,911.25
New York	424	363,646.12	3,952	761,355.77	1,013	13,581.60	5,389	1,138,583.49
New Jersey			594	81,760.77	514	6,256.24	1,108	88,017.01
Pennsylvania	73	64,243.54	846	224,015.15	142	2,586.75	1,061	290,845.44
Delaware	1	625.20	136	15,640.50	38	465.49	175	16,781.19
Maryland	68	26,650.06	1,081	105,284.90	1,084	12,996.42	2,233	144,881.38
District of Columbia			36	9,590.91	31	490.86	67	10,081.77
Virginia	11	5,327.77	417	27,872.33	836	9,056.29	1,264	42,256.39
North Carolina	11	2,809.32	94	7,281.41	226	2,599.12	331	12,689.85
South Carolina	5	1,604.06	80	8,412.07	121	1,609.15	206	11,625.28
Georgia	10	4,714.85	71	27,036.25	50	711.93	131	32,463.73
Florida	58	14,042.42	152	16,198.67	281	3,475.48	491	33,711.52
Alabama	12	2,850.94	70	7,574.81	50	557.29	132	10,983.04
Mississippi	11	2,280.54	98	5,457.28	80	1,043.42	184	8,811.24
Louisiana	54	16,043.95	216	45,653.71	308	3,373.18	578	65,075.84
Texas	18	4,258.45	95	6,744.39	145	1,654.33	258	12,657.17
Tennessee			100	20,442.60	4	86.15	104	20,528.75
Kentucky			76	18,440.69	4	53.28	80	18,493.97
Missouri			254	163,088.50	16	262.94	270	163,351.44
Nebraska			20	3,610.51	2	26.05	22	3,636.56
Iowa			72	9,797.96	1	17.68	73	9,815.64
Minnesota			79	8,800.84	2	31.65	81	8,832.49
Wisconsin			301	82,401.72	2	33.85	303	82,435.57
Michigan			1,076	234,121.43			1,076	234,121.43
Illinois	2	980.90	373	68,319.33	1	7.80	376	69,308.03
Indiana			55	8,198.62			55	8,198.62
Ohio			434	174,894.69	5	74.41	439	174,969.10
West Virginia			96	10,387.90	5	87.55	101	10,475.45
California	195	113,663.53	555	132,552.50	135	1,916.90	885	248,132.93
Oregon	8	6,519.24	124	49,289.20	59	997.99	191	56,806.43
Washington	101	21,727.91	49	20,054.86	27	337.60	177	42,120.37
Alaska			7	433.62	13	191.36	20	624.98
Total	1,769	1,111,179.13	15,283	2,988,762.42	6,482	81,194.28	23,534	4,181,135.83

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SUMMARY.

Atlantic and Gulf Coasts	1,450	907,897.06	9,976	1,041,745.85	6,178	76,876.52	17,066	2,035,393.49
Pacific Coast	304	141,910.68	735	202,890.18	234	3,443.85	1,278	347,664.71
Northern Lakes	2	960.90	3,398	761,517.90	5	61.77	3,405	762,540.57
Western Rivers	4	420.47	1,174	838,168.89	70	1,813.13	1,246	834,403.29
Grand total	1,760	1,111,179.13	15,283	2,988,762.42	6,482	81,194.28	23,534	4,131,125.06

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No. 3.—*Number and Tonnage of* **REGISTERED, ENROLLED,** *and* **LICENSED STEAM VESSELS** *of the United States, June 30,* **1886.**

STATES AND CUSTOMS DISTRICTS IN WHICH DOCUMENTED.	REGISTERED.		ENROLLED.		LICENSED, under 20 tons.		TOTAL.	
	No.	Tons.	No.	Tons.	No.	Tons.	No.	Tons.
THE ATLANTIC AND GULF COASTS.								
MAINE.								
Passamaquoddy			4	3,352.79	7	157.74	11	3,510.53
Machias					5	122.70	5	122.70
Frenchman's Bay			3	411.62	4	82.29	7	493.91
Castine			1	25.28	2	29.77	3	55.05
Bangor	1	34.50	9	786.44	2	21.08	12	842.11
Belfast			2	92.00			2	92.00
Waldoborough			3	753.98	1	38.56	4	792.54
Wiscasset			2	105.68			2	105.68
Bath			18	3,213.72	9	288.48	27	3,502.20
Portland and Falmouth	2	2,045.67	23	9,936.86	14	297.55	39	12,279.58
Saco			3	231.07			3	231.07
Kennebunk					1	14.89	1	14.89
Total	3	2,080.26	68	18,908.94	45	1,053.06	116	22,042.26
NEW HAMPSHIRE.								
Portsmouth			3	294.35	4	94.16	7	388.51
MASSACHUSETTS.								
Newburyport			8	780.04	6	113.19	14	893.23
Gloucester			2	110.78	6	162.26	8	273.04
Salem and Beverly			2	118.36	3	51.66	5	170.02
Marblehead					1	10.91	1	10.91
Boston and Charlestown	8	8,139.13	68	34,505.50	25	730.45	101	43,465.08
Plymouth			1	344.11			1	344.11
Barnstable			1	46.27			1	46.27
Nantucket			1	578.37			1	578.37
New Bedford	3	945.85	8	1,821.04	3	69.60	14	2,836.49
Fall River			18	21,766.40	2	41.16	20	21,807.56
Total	11	9,084.98	109	60,160.87	46	1,179.23	166	70,425.08

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RHODE ISLAND.								
Providence			26	19,639.27	6	106.47	32	19,135.74
Bristol and Warren	1	106.45			2	18.29	3	124.74
Newport			12	1,813.75	2	53.89	14	1,867.64
Total	1	106.45	38	20,843.02	10	178.65	49	21,128.12
CONNECTICUT.								
Stonington			10	2,242.33	1	14.10	11	2,256.43
New London			31	15,995.08	5	110.49	36	16,105.57
Middletown			8	3,642.67	10	244.23	18	3,886.90
New Haven			36	8,302.57	12	240.92	48	8,543.79
Fairfield			30	5,416.37	10	190.85	40	5,607.22
Total			115	35,599.32	38	800.59	153	36,399.91
NEW YORK.								
New York	46	79,323.63	743	269,994.38	241	5,673.06	1,030	354,991.07
Sag Harbor			25	2,849.36	2	23.23	27	2,872.59
Total	46	79,323.63	768	272,843.74	243	5,696.29	1,057	357,863.66
NEW JERSEY.								
Newark			22	3,339.26	12	295.13	34	3,634.39
Perth Amboy			33	7,157.63	7	140.26	40	7,297.89
Little Egg Harbor			2	160.89	1	16.32	3	177.21
Great Egg Harbor			4	445.57	2	14.92	6	460.49
Bridgeton			4	647.19	1	31.97	5	679.16
Burlington			7	1,004.44	4	126.42	11	1,130.86
Total			72	12,754.98	27	625.02	99	13,380.00
PENNSYLVANIA.								
Philadelphia	14	20,416.90	174	52,677.82	78	1,742.34	266	74,837.06
DELAWARE.								
Delaware			18	3,927.38	8	134.13	26	4,061.51
MARYLAND.								
Baltimore	1	622.25	104	52,217.27	60	1,280.55	165	54,120.07
Annapolis			1	106.15			1	106.15
Eastern Maryland			3	184.33	1	23.95	4	208.28
Total	1	622.25	108	52,507.75	61	1,304.50	170	54,434.50
DISTRICT OF COLUMBIA.								
Georgetown			20	8,386.64	11	249.45	31	8,636.09

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No. 3.—*Number and Tonnage of* **REGISTERED, ENROLLED,** *and* **LICENSED STEAM VESSELS** *of the United States, June 30,* **1886**—Continued.

STATES AND CUSTOMS DISTRICTS IN WHICH DOCUMENTED.	REGISTERED.		ENROLLED.		LICENSED, under 20 tons.		TOTAL.	
	No.	Tons.	No.	Tons.	No.	Tons.	No.	Tons.
THE ATLANTIC AND GULF COASTS—Continued.								
VIRGINIA.								
Alexandria			8	419.41	2	27.20	10	446.61
Tappahannock			3	160.76			3	160.76
Richmond			8	865.18	8	162.19	16	1,027.37
Petersburg			2	173.67	2	36.81	4	210.48
Yorktown			3	792.54	1	27.25	4	819.79
Norfolk and Portsmouth	1	132.73	36	4,410.29	21	461.46	58	5,005.18
Cherrystone			2	125.67			2	125.67
Total	1	132.73	62	6,967.22	34	714.91	97	7,814.86
NORTH CAROLINA.								
Albemarle			10	2,134.43	17	189.38	27	2,394.81
Pamlico			11	828.28	5	85.40	16	918.68
Beaufort			2	99.46			2	99.46
Wilmington			9	976.53	4	115.72	13	1,092.25
Total			32	4,033.70	26	381.50	58	4,415.20
SOUTH CAROLINA.								
Georgetown			9	876.92	5	95.53	14	972.45
Charleston			21	4,540.15	5	96.85	26	4,637.00
Beaufort			5	488.49	4	131.60	9	620.09
Total			35	5,905.56	14	322.98	49	6,229.54
GEORGIA.								
Savannah			25	22,242.06	9	213.51	34	22,455.57
Brunswick			10	1,288.87	4	48.73	14	1,337.60
Saint Mary's			1	34.27			1	34.27
Total			36	23,565.20	13	262.24	49	23,827.44
FLORIDA.								
Fernandina			2	354.88	1	34.13	3	389.01
Saint John's			36	3,993.06	16	264.99	52	4,258.05

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Saint Augustine			2	259.59	1	16.83	3	276.41
Key West	8	2,808.79	5	1,020.73	4	117.68	17	4,005.18
Saint Mark's			5	692.96	5	89.29	10	721.65
Apalachicola			8	1,172.50	3	69.39	11	1,241.89
Pensacola			13	1,414.19	6	124.31	19	1,538.41
Total	8	2,808.79	71	8,907.23	36	716.59	115	12,430.60
ALABAMA.								
Mobile			44	5,747.59	5	76.78	49	5,824.37
MISSISSIPPI.								
Pearl River			6	768.61	3	91.98	9	860.54
LOUISIANA.								
New Orleans	11	9,280.27	16	22,286.80			27	31,567.07
Teche			17	1,119.75	13	225.77	30	1,345.52
Total	11	9,280.27	33	23,406.55	13	225.77	57	32,912.59
TEXAS.								
Galveston	1	2,556.29	24	2,723.23	9	178.98	34	5,458.50
Corpus Christi			2	157.80			2	157.80
Brazos de Santiago	3	273.61					3	273.61
Total	4	2,829.90	26	2,881.03	9	178.98	39	5,889.91
Total Atlantic and Gulf Coasts	100	126,694.16	1,838	620,587.49	724	16,030.10	2,662	763,301.75
THE PACIFIC COAST.								
CALIFORNIA.								
San Diego					2	34.16	2	34.16
Wilmington			3	207.98			3	207.98
San Francisco	30	41,356.70	133	60,369.03	21	422.36	183	102,178.08
Humboldt			10	1,071.81			10	1,071.81
Total	30	41,356.70	145	61,748.76	23	456.52	198	103,591.98
OREGON.								
Southern Oregon			6	493.50	5	114.81	11	608.31
Yaquina			6	1,406.59			6	1,406.59
Oregon	1	56.59	14	1,681.29	19	423.29	34	2,161.17
Willamette	1	278.15	70	37,883.88	10	198.98	81	38,341.01
Total	2	334.74	96	41,445.26	34	737.08	132	42,517.08

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No. 3.—*Number and Tonnage of* **REGISTERED, ENROLLED,** *and* **LICENSED STEAM VESSELS** *of the United States, June* 30, **1886**—Continued.

STATES AND CUSTOMS DISTRICTS IN WHICH DOCUMENTED.	REGISTERED.		ENROLLED.		LICENSED, under 20 tons.		TOTAL.	
	No.	Tons.	No.	Tons.	No.	Tons.	No.	Tons.
THE PACIFIC COAST—Continued.								
WASHINGTON.								
Puget Sound	49	7,807.10	25	2,204.09	12	200.05	86	10,211.24
ALASKA.								
Alaska			3	346.94	1	18.35	4	365.29
Total Pacific Coast	81	49,528.54	269	105,745.05	70	1,412.00	420	156,685.59
THE NORTHERN LAKES.								
VERMONT.								
Vermont			9	2,383.92			9	2,383.92
NEW YORK.								
Champlain			13	1,197.72			13	1,197.72
Oswegatchie			17	1,058.73			17	1,058.73
Cape Vincent			20	1,410.71			20	1,410.71
Oswego			19	1,897.57			19	1,897.57
Genesee			12	1,034.63			12	1,034.63
Niagara			7	1,469.99			7	1,469.99
Buffalo Creek			132	78,954.00			132	78,954.00
Total			220	87,023.35			220	87,023.35
PENNSYLVANIA.								
Erie			28	24,706.85	1	13.78	29	24,720.63
OHIO.								
Cuyahoga			85	54,792.13			85	54,792.13
Sandusky			36	9,319.60			36	9,319.60
Miami			30	6,710.48			30	6,710.48
Total			151	70,822.21			151	70,822.21

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MICHIGAN.								
Detroit			140	55,879.98			140	55,879.98
Huron			138	34,273.37			138	34,273.37
Superior			76	9,537.84			76	9,537.84
Michigan			171	17,157.75			171	17,157.75
Total			525	116,848.94			525	116,848.94
ILLINOIS.								
Chicago			216	51,010.77			216	51,010.77
WISCONSIN.								
Milwaukee			110	28,523.37			110	28,523.37
MINNESOTA.								
Duluth			20	624.61			20	624.61
Total Northern lakes			1,279	381,894.02	1	13.78	1,280	381,907.80
THE WESTERN RIVERS.								
LOUISIANA.								
New Orleans	4	420.47	106	19,552.95	15	422.24	125	20,395.66
MISSISSIPPI.								
Natchez			3	303.23			3	303.23
Vicksburg			24	2,439.65	6	115.86	30	2,555.51
Total			27	2,742.88	6	115.86	33	2,858.74
TENNESSEE.								
Memphis			68	13,713.38	2	61.60	70	13,774.98
Nashville			17	4,063.90	2	24.55	19	4,088.45
Chattanooga			15	2,665.32			15	2,665.32
Total			100	20,442.60	4	86.15	104	20,528.75
KENTUCKY.								
Paducah			22	3,480.69	1	15.55	23	3,496.24
Louisville			54	14,960.00	3	37.73	57	14,997.73
Total			76	18,440.69	4	53.28	80	18,493.97
MISSOURI.								
Saint Louis			115	49,505.50	14	233.40	129	49,738.90
Kansas City			11	1,130.00	2	29.54	13	1,159.54
Saint Joseph			4	687.55			4	687.55
Total			130	51,323.05	16	262.94	146	51,585.99

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No. 3.—*Number and Tonnage of* **REGISTERED, ENROLLED,** *and* **LICENSED STEAM VESSELS** *of the United States, June* 30, **1886**—Continued.

STATES AND CUSTOMS DISTRICTS IN WHICH DOCUMENTED.	REGISTERED.		ENROLLED.		LICENSED, under 20 tons.		TOTAL.	
	No.	Tons.	No.	Tons.	No.	Tons.	No.	Tons.
THE WESTERN RIVERS—Continued.								
NEBRASKA.								
Omaha			20	3,610.51	2	26.05	22	3,636.56
IOWA.								
Burlington			45	4,908.84			45	4,908.84
Dubuque			23	4,547.21	1	17.68	24	4,564.89
Total			68	9,456.05	1	17.68	69	9,473.73
MINNESOTA.								
Minnesota			44	6,399.56	2	31.65	46	6,431.21
WISCONSIN.								
La Crosse			39	3,349.40	2	33.85	41	3,383.25
ILLINOIS.								
Galena			22	2,533.01	1	7.80	23	2,542.81
INDIANA.								
Evansville			55	8,198.62			55	8,198.62
OHIO.								
Cincinnati			101	31,519.62	5	74.41	106	31,594.03
WEST VIRGINIA.								
Wheeling			96	10,387.90	5	87.55	101	10,475.45
PENNSYLVANIA.								
Pittsburgh			147	31,396.52	7	93.67	154	31,490.20
Total Western Rivers	4	420.47	1,031	219,855.16	70	1,313.13	1,105	221,588.76

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SUMMARY.

Atlantic and Gulf Coasts	100	126,684.16	1,838	620,587.49	724	16,030.10	2,662	763,301.75
Pacific Coast	81	49,538.54	209	105,745.05	70	1,412.00	420	156,695.59
Northern Lakes	.....	.....	1,279	381,894.02	1	13.78	1,280	381,907.80
Western Rivers	4	420.47	1,031	219,355.16	70	1,313.13	1,105	221,088.76
Grand total	185	176,643.17	4,417	1,327,581.72	865	18,769.01	5,467	1,522,993.90

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No. 4.—*Statement showing the Number and Tonnage of* **REGISTERED, ENROLLED,** *and* **LICENSED IRON VESSELS** *of the United States, June 30,* **1886.**

STATES AND CUSTOMS DISTRICTS IN WHICH DOCUMENTED.	REGISTERED.				ENROLLED.				LICENSED.		TOTAL.	
	PERMANENTLY.		TEMPORARILY.		PERMANENTLY.		TEMPORARILY.		UNDER 20 TONS.			
	No.	Tons.	No.	Tons.	No.	Tons.	No.	Tons.	No.	Tons.	No.	Tons.
THE ATLANTIC AND GULF COASTS.												
MASSACHUSETTS.												
Boston and Charlestown	1	2,199.45			11	10,168.35					12	12,367.80
Fall River					1	3,483.66					1	3,483.66
Total	1	2,199.45			12	13,652.01					13	15,851.46
CONNECTICUT.												
New London					3	4,282.64					3	4,282.64
New Haven					4	1,433.07					4	1,433.07
Fairfield					1	1,098.31					1	1,098.31
Total					8	6,814.02					8	6,814.02
NEW YORK.												
New York	80	69,826.19	4	2,807.60	91	92,163.45					125	164,797.24
NEW JERSEY.												
Newark					3	307.31					3	307.31
Perth Amboy					5	792.88					5	792.88
Little Egg Harbor					1	119.08					1	119.08
Total					9	1,219.27					9	1,219.27
PENNSYLVANIA.												
Philadelphia	7	15,251.58	8	8,619.50	87	35,568.47	3	627.10			105	60,066.65
DELAWARE.												
Delaware					6	1,990.49					6	1,990.49
MARYLAND.												
Baltimore	1	692.25			48	31,099.73			4	110.70	53	31,892.68

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DISTRICT OF COLUMBIA.												
Georgetown					4	1,899.84					4	1,899.84
VIRGINIA.												
Alexandria							1	573.47			1	573.47
Richmond					1	493.82			1	15.07	2	508.89
Norfolk and Portsmouth					7	888.70			2	52.88	9	941.58
Total					8	1,382.52	1	573.47	3	67.95	12	2,023.94
NORTH CAROLINA.												
Albemarle					3	1,132.13					3	1,132.13
Wilmington					4	641.88					4	641.88
Total					7	1,774.01					7	1,774.01
SOUTH CAROLINA.												
Charleston					4	588.05					4	588.05
Beaufort									1	35.07	1	35.07
Total					4	588.05			1	35.07	5	623.12
GEORGIA.												
Savannah					10	19,014.48					10	19,014.48
Brunswick					2	168.72					2	168.72
Total					12	19,183.20					12	19,183.20
FLORIDA.												
Fernandina							1	287.58			1	287.58
Pensacola					7	718.92	1	61.21			8	780.13
Total					7	718.92	2	348.79			9	1,067.71
LOUISIANA.												
New Orleans	7	7,310.73			14	22,087.18					21	29,397.91
TEXAS.												
Galveston			1	2,556.29	3	197.17					4	2,753.46
Total Atlantic and Gulf Coasts	46	95,210.20	13	13,983.39	320	230,338.33	0	1,549.36	8	213.72	393	341,295.00
THE PACIFIC COAST.												
CALIFORNIA.												
San Francisco	5	10,930.18	7	16,561.17	5	3,975.28	4	8,351.60	1	27.05	22	39,845.28

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No. 4.—*Statement showing the Number and Tonnage of* **REGISTERED, ENROLLED,** *and* **LICENSED IRON VESSELS** *of the United States, June 30,* **1886.**

STATES AND CUSTOMS DISTRICTS IN WHICH DOCUMENTED.	REGISTERED.				ENROLLED.				LICENSED.		TOTAL.	
	PERMANENTLY.		TEMPORARILY.		PERMANENTLY.		TEMPORARILY.		UNDER 20 TONS.			
	No.	Tons.	No.	Tons.	No.	Tons.	No.	Tons.	No.	Tons.	No.	Tons.
THE ATLANTIC AND GULF COASTS.												
MASSACHUSETTS.												
Boston and Charlestown	1	2,199.45			11	10,168.35					12	12,367.80
Fall River					1	3,483.66					1	3,483.66
Total	1	2,199.45			12	13,652.01					13	15,851.46
CONNECTICUT.												
New London					3	4,282.64					3	4,282.64
New Haven					4	1,433.07					4	1,433.07
Fairfield					1	1,098.31					1	1,098.31
Total					8	6,814.02					8	6,814.02
NEW YORK.												
New York	80	69,826.19	4	2,807.60	91	92,163.45					125	164,797.24
NEW JERSEY.												
Newark					3	307.31					3	307.31
Perth Amboy					5	792.88					5	792.88
Little Egg Harbor					1	119.08					1	119.08
Total					9	1,219.27					9	1,219.27
PENNSYLVANIA.												
Philadelphia	7	15,251.58	8	8,619.50	87	35,568.47	3	627.10			105	60,066.65
DELAWARE.												
Delaware					6	1,990.49					6	1,990.49
MARYLAND.												
Baltimore	1	692.25			48	31,099.73			4	110.70	53	31,892.68

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DISTRICT OF COLUMBIA.												
Georgetown					4	1,899.84					4	1,899.84
VIRGINIA.												
Alexandria							1	573.47			1	573.47
Richmond					1	493.82			1	15.07	2	508.89
Norfolk and Portsmouth					7	888.70			2	52.88	9	941.58
Total					8	1,382.52	1	573.47	3	67.95	12	2,023.94
NORTH CAROLINA.												
Albemarle					3	1,132.13					3	1,132.13
Wilmington					4	641.88					4	641.88
Total					7	1,774.01					7	1,774.01
SOUTH CAROLINA.												
Charleston					4	588.05					4	588.05
Beaufort									1	35.07	1	35.07
Total					4	588.05			1	35.07	5	623.12
GEORGIA.												
Savannah					10	19,014.48					10	19,014.48
Brunswick					2	168.72					2	168.72
Total					12	19,183.20					12	19,183.20
FLORIDA.												
Fernandina							1	287.58			1	287.58
Pensacola					7	718.92	1	61.21			8	780.13
Total					7	718.92	2	348.79			9	1,067.71
LOUISIANA.												
New Orleans	7	7,310.73			14	22,087.18					21	29,397.91
TEXAS.												
Galveston			1	2,556.29	3	197.17					4	2,753.46
Total Atlantic and Gulf Coasts	46	95,210.20	13	13,983.39	320	230,338.33	6	1,549.36	8	213.72	393	341,295.00
THE PACIFIC COAST.												
CALIFORNIA.												
San Francisco	5	10,930.18	7	16,561.17	5	3,975.28	4	8,351.60	1	27.05	22	39,845.28

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No. 4.—*Statement showing the Number and Tonnage of* **REGISTERED, ENROLLED,** *and* **LICENSED IRON VESSELS** *of the United States, June* 30, **1886**—Continued.

STATES AND CUSTOMS DISTRICTS IN WHICH DOCUMENTED.	REGISTERED.				ENROLLED.				LICENSED.		TOTAL.	
	PERMANENTLY.		TEMPORARILY.		PERMANENTLY.		TEMPORARILY.		UNDER 20 TONS.			
	No.	Tons.	No.	Tons.	No.	Tons.	No.	Tons.	No.	Tons.	No.	Tons.
THE PACIFIC COAST—Continued.												
OREGON.												
Yaquina					1	1,210.98					1	1,210.98
Willamette					8	15,437.77	1	1,362.03			9	16,799.80
Total					9	16,648.75	1	1,362.03			10	18,010.78
Total Pacific Coast	5	10,930.18	7	16,561.17	14	20,624.03	5	9,718.63	1	27.05	32	57,856.06
THE NORTHERN LAKES.												
NEW YORK.												
Champlain					2	239.45					2	239.45
Buffalo Creek					12	14,365.17					12	14,365.17
Total					14	14,604.62					14	14,604.62
PENNSYLVANIA.												
Erie					6	8,174.61					6	8,174.61
OHIO.												
Cuyahoga					6	7,201.75					6	7,201.75
MICHIGAN.												
Detroit					7	7,920.95					7	7,920.95
Michigan					5	2,515.18					5	2,515.18
Total					12	10,436.13					12	10,436.13
ILLINOIS.												
Chicago					2	281.75					2	281.75

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MINNESOTA.												
Duluth							1	37.68			1	37.68
Total Northern Lakes					40	40,698.86	1	37.68			41	40 736.54
THE WESTERN RIVERS.												
LOUISIANA.												
New Orleans			1	134.28	11	1,642.81	1	80.94			13	1,858.03
MISSISSIPPI.												
Natchez					1	44.49					1	44.49
TENNESSEE.												
Memphis									2	61.60	2	61.60
MISSOURI.												
Saint Louis					3	1,499.14					3	1,499.14
MINNESOTA.												
Saint Paul					1	96.72					1	96.72
WISCONSIN.												
La Crosse					1	121.20					1	121.20
INDIANA.												
Evansville					1	56.37					1	56.37
PENNSYLVANIA.												
Pittsburgh					1	329.73					1	329.73
Total Western Rivers			1	134.28	19	3,790.46	1	80.94	2	61.60	23	4,067.28

SUMMARY.

Atlantic and Gulf Coasts	46	95,210.20	13	13,983.39	320	230,338.33	6	1,549.86	8	213.72	393	341,295.00
Pacific Coast	5	10,930.18	7	16,561.17	14	20,024.03	5	9,713.63	1	27.05	32	57,856.06
Northern Lakes					40	40,698.86	1	37.68			41	40,736.54
Western Rivers			1	134.28	19	3,790.46	1	80.94	2	61.60	23	4,067.28
Grand total	51	106,140.38	21	30,678.84	393	295,451.08	13	11,381.61	11	302.37	489	443,954.88

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No. 5.—*Statement showing the Number and Tonnage of* **REGISTERED, ENROLLED,** *and* **LICENSED STEAM IRON VESSELS** *of the United States, June* 30, **1886.**

STATES AND CUSTOMS DISTRICTS IN WHICH DOCUMENTED.	REGISTERED.		ENROLLED.		LICENSED.		TOTAL.	
	No.	Tons.	No.	Tons.	No.	Tons.	No.	Tons.
THE ATLANTIC AND GULF COASTS.								
MASSACHUSETTS.								
Boston and Charlestown	1	2,199.45	10	10,131.49	.....	.....	11	12,330.94
Fall River	.....	.....	1	3,483.66	.....	.....	1	3,483.66
Total	1	2,199.45	11	13,615.15	.....	.....	12	15,814.60
CONNECTICUT.								
New London	.....	.....	3	4,282.64	.....	.....	3	4,282.64
New Haven	.....	.....	4	1,433.07	.....	.....	4	1,433.07
Fairfield	.....	.....	1	1,098.31	.....	.....	1	1,098.31
Total	.....	.....	8	6,814.02	.....	.....	8	6,814.02
NEW YORK.								
New York	33	70,600.91	89	92,043.86	.....	.....	122	162,644.77
NEW JERSEY.								
Newark	.....	.....	3	307.31	.....	.....	3	307.31
Perth Amboy	.....	.....	5	792.88	.....	.....	5	792.88
Little Egg Harbor	.....	.....	1	119.08	.....	.....	1	119.08
Total	.....	.....	9	1,219.27	.....	.....	9	1,219.27
PENNSYLVANIA.								
Philadelphia	13	19,875.76	87	35,349.50	.....	.....	100	55,225.26
DELAWARE.								
Delaware	.....	.....	6	1,990.49	.....	.....	6	1,990.49
MARYLAND.								
Baltimore	1	622.25	48	31,099.73	4	110.70	53	31,832.68
DISTRICT OF COLUMBIA.								
Georgetown	.....	.....	4	1,899.84	.....	.....	4	1,899.84
VIRGINIA.								
Richmond	.....	.....	1	493.82	1	15.07	2	508.89
Norfolk and Portsmouth	.....	.....	7	888.70	2	52.88	9	941.58
Total	.....	.....	8	1,382.52	3	67.95	11	1,450.47
NORTH CAROLINA.								
Albemarle	.....	.....	3	1,132.13	.....	.....	3	1,132.13
Wilmington	.....	.....	4	641.88	.....	.....	4	641.88
Total	.....	.....	7	1,774.01	.....	.....	7	1,774.01
SOUTH CAROLINA.								
Charleston	.....	.....	4	588.05	.....	.....	4	588.05
Beaufort	.....	.....	.....	.....	1	35.07	1	35.07
Total	.....	.....	4	588.05	1	35.07	5	623.12
GEORGIA.								
Savannah	.....	.....	10	19,014.48	.....	.....	10	19,014.48
Brunswick	.....	.....	2	168.72	.....	.....	2	168.72
Total	.....	.....	12	19,183.20	.....	.....	12	19,183.20

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No. 5.—*Statement showing the Number and Tonnage of* **REGISTERED, ENROLLED,** *and* **LICENSED STEAM IRON VESSELS** *of the United States, June* 30, **1886**—Continued.

STATES AND CUSTOMS DISTRICTS IN WHICH DOCUMENTED.	REGISTERED.		ENROLLED.		LICENSED.		TOTAL.	
	No.	Tons.	No.	Tons.	No.	Tons.	No.	Tons.
THE ATLANTIC AND GULF COASTS—Continued.								
FLORIDA.								
Fernandina	....	....	1	287.58	.....	.....	1	287.58
Pensacola	....	....	8	780.13	.....	.....	8	780.13
Total	....	....	9	1,067.71	.....	.....	9	1,067.71
LOUISIANA.								
New Orleans	7	7,310.73	14	22,087.18	.....	.....	21	29,397.91
TEXAS.								
Galveston	1	2,556.29	3	197.17	.....	.....	4	2,753.46
Total Atlantic and Gulf Coasts	56	103,165.39	319	230,311.70	8	213.72	383	333,690.81
THE PACIFIC COAST.								
CALIFORNIA.								
San Francisco	11	26,494.00	9	12,326.88	1	27.05	21	38,847.93
OREGON.								
Yaquina	....	....	1	1,210.98	.....	.....	1	1,210.98
Willamette	....	....	9	16,799.80	.....	.....	9	16,799.80
Total	....	....	10	18,010.78	.....	.....	10	18,010.78
Total Pacific Coast	11	26,494.00	19	30,337.66	1	27.05	31	56,858.71
THE NORTHERN LAKES.								
NEW YORK.								
Champlain	....	....	2	239.45	.....	.....	2	239.45
Buffalo Creek	....	....	12	14,365.17	.....	.....	12	14,365.17
Total	....	....	14	14,604.62	.....	.....	14	14,604.62
PENNSYLVANIA.								
Erie	....	....	6	8,174.61	.....	.....	6	8,174.61
OHIO.								
Cuyahoga	....	....	6	7,201.75	.....	.....	6	7,201.75
MICHIGAN.								
Detroit	....	....	7	7,920.95	.....	.....	7	7,920.95
Michigan	....	....	5	2,515.18	.....	.....	5	2,515.18
Total	....	....	12	10,436.13	.....	.....	12	10,436.13
ILLINOIS.								
Chicago	....	....	2	281.75	.....	.....	2	281.75
MINNESOTA.								
Duluth	....	....	1	37.68	.....	.....	1	37.68
Total Northern Lakes	....	....	41	40,736.54	.....	.....	41	40,736.54
THE WESTERN RIVERS.								
LOUISIANA.								
New Orleans	1	134.28	12	1,723.75	.....	.....	13	1,858.03

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No. 5.—*Statement showing the Number and Tonnage of* **REGISTERED, ENROLLED,** *and* **LICENSED STEAM IRON VESSELS** *of the United States, June* 30, **1886**—Continued.

STATES AND CUSTOMS DISTRICTS IN WHICH DOCUMENTED.	REGISTERED.		ENROLLED.		LICENSED.		TOTAL.	
	No.	Tons.	No.	Tons.	No.	Tons.	No.	Tons.
THE WESTERN RIVERS—Continued.								
MISSISSIPPI.								
Natches	....	.....	1	44.49	.....	.....	1	44.49
TENNESSEE.								
Memphis	....	.....	.....	.....	2	61.60	2	61.60
MISSOURI.								
Saint Louis	....	.....	3	1,499.14	.....	.....	3	1,499.14
MINNESOTA.								
Minnesota	....	.....	1	96.72	.....	.....	1	96.72
WISCONSIN.								
La Crosse	....	.....	1	121.20	.....	.....	1	121.20
INDIANA.								
Evansville	....	.....	1	56.37	.....	.....	1	56.37
PENNSYLVANIA.								
Pittsburgh	....	.....	1	329.73	.....	.....	1	329.73
Total Western Rivers	1	134.28	20	3,871.40	2	61.60	23	4,067.28

SUMMARY.

Atlantic and Gulf Coasts	56	103,165.39	319	230,311.70	8	213.72	383	333,690.81
Pacific Coast	11	26,494.00	19	30,337.66	1	27.05	31	56,858.71
Northern Lakes	.....	.....	41	40,736.54	.....	.....	41	40,736.54
Western Rivers	1	134.28	20	3,871.40	2	61.60	23	4,067.28
Grand total	68	129,793.67	399	305,257.30	11	302.37	478	435,353.34

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No. 6.—*Statement showing the Class, Number, and Tonnage of* **IRON VESSELS** *of the United States, June* 30, **1886.**

STATES AND CUSTOMS DISTRICTS IN WHICH DOCUMENTED.	SAILING VESSELS.		STEAM VESSELS.		TOTAL.	
	No.	Tons.	No.	Tons.	No.	Tons.
THE ATLANTIC AND GULF COASTS.						
MASSACHUSETTS.						
Boston and Charlestown	1	36.86	11	12,330.94	12	12,367.80
Fall River	.....	.....	1	3,483.66	1	3,483.66
Total	1	36.86	12	15,814.60	13	15,851.46
CONNECTICUT.						
New London	.....	.....	3	4,282.64	3	4,282.64
New Haven	.....	.....	4	1,433.07	4	1,433.07
Fairfield	.....	.....	1	1,098.31	1	1,098.31
Total	.....	.....	8	6,814.02	8	6,814.02
NEW YORK.						
New York	3	2,152.47	122	162,644.77	125	164,797.24
NEW JERSEY.						
Newark	.....	.....	3	307.31	3	307.31
Perth Amboy	.....	.....	5	792.88	5	792.88
Little Egg Harbor	.....	.....	1	119.08	1	119.08
Total	.....	.....	9	1,219.27	9	1,219.27
PENNSYLVANIA.						
Philadelphia	5	4,841.39	100	55,225.26	105	60,066.65
DELAWARE.						
Delaware	.....	.....	6	1,990.49	6	1,990.49
MARYLAND.						
Baltimore	.....	.....	53	31,832.68	53	31,832.68
DISTRICT OF COLUMBIA.						
Georgetown	.....	.....	4	1,899.84	4	1,899.84
VIRGINIA.						
Alexandria	1	573.47	.....	.....	1	573.47
Richmond	.....	.....	2	508.89	2	508.89
Norfolk and Portsmouth	.....	.....	9	941.58	9	941.58
Total	1	573.47	11	1,450.47	12	2,023.94
NORTH CAROLINA.						
Albemarle	.....	.....	3	1,132.13	3	1,132.13
Wilmington	.....	.....	4	641.88	4	641.88
Total	.....	.....	7	1,774.01	7	1,774.01
SOUTH CAROLINA.						
Charleston	.....	.....	4	588.05	4	588.05
Beaufort	.....	.....	1	35.07	1	35.07
Total	.....	.....	5	623.12	5	623.12
GEORGIA.						
Savannah	.....	.....	10	19,014.48	10	19,014.48
Brunswick	.....	.....	2	168.72	2	168.72
Total	.....	.....	12	19,183.20	12	19,183.20

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No. 6.—*Statement showing the Class, Number, and Tonnage of* **IRON VESSELS** *of the United States, June 30,* **1886**—Continued.

STATES AND CUSTOMS DISTRICTS IN WHICH DOCUMENTED.	SAILING VESSELS.		STEAM VESSELS.		TOTAL.	
	No.	Tons.	No.	Tons.	No.	Tons.
THE ATLANTIC AND GULF COASTS—Continued.						
FLORIDA.						
Fernandina			1	287.58	1	287.58
Pensacola			8	780.13	8	780.13
Total			9	1,067.71	9	1,067.71
LOUISIANA.						
New Orleans			21	29,397.91	21	29,397.91
TEXAS.						
Galveston			4	2,753.46	4	2,753.46
Total Atlantic and Gulf Coasts	10	7,604.19	383	333,690.81	393	341,295.00
THE PACIFIC COAST.						
CALIFORNIA.						
San Francisco	1	997.35	21	38,847.93	22	39,845.28
OREGON.						
Yaquina			1	1,210.98	1	1,210.98
Willamette			9	16,799.80	9	16,799.80
Total			10	18,010.78	10	18,010.78
Total Pacific Coast	1	997.35	31	56,858.71	32	57,856.06
THE NORTHERN LAKES.						
NEW YORK.						
Champlain			2	289.45	2	289.45
Buffalo Creek			12	14,365.17	12	14,365.17
Total			14	14,604.62	14	14,604.62
PENNSYLVANIA.						
Erie			6	8,174.61	6	8,174.61
OHIO.						
Cuyahoga			6	7,201.75	6	7,201.75
MICHIGAN.						
Detroit			7	7,920.95	7	7,920.95
Michigan			5	2,515.18	5	2,515.18
Total			12	10,436.13	12	10,436.13
ILLINOIS.						
Chicago			2	281.75	2	281.75
MINNESOTA.						
Duluth			1	37.68	1	37.68
Total Northern Lakes			41	40,736.54	41	40,736.54
THE WESTERN RIVERS.						
LOUISIANA.						
New Orleans			13	1,858.03	13	1,858.03

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No. 6.—*Statement showing the Class, Number, and Tonnage of* **IRON VESSELS** *of the United States, June* 30, **1886**—Continued.

STATES AND CUSTOMS DISTRICTS IN WHICH DOCUMENTED.	SAILING VESSELS.		STEAM VESSELS.		TOTAL.	
	No.	Tons.	No.	Tons.	No.	Tons.
THE WESTERN RIVERS—Continued.						
MISSISSIPPI.						
Natchez	.....	.....	1	44.49	1	44.49
TENNESSEE.						
Memphis	.....	.....	2	61.60	2	61.60
MISSOURI.						
Saint Louis	.....	.....	3	1,499.14	3	1,499.14
MINNESOTA.						
Minnesota	.....	.....	1	96.72	1	96.72
WISCONSIN.						
La Crosse	.....	.....	1	121.20	1	121.20
INDIANA.						
Evansville	.....	.....	1	56.37	1	56.37
PENNSYLVANIA.						
Pittsburgh	.....	.....	1	329.73	1	329.73
Total Western Rivers	.....	.....	23	4,067.28	23	4,067.28

SUMMARY.

Atlantic and Gulf Coasts	10	7,604.19	383	333,690.81	393	341,295.00
Pacific Coast	1	997.35	31	56,858.71	32	57,856.06
Northern Lakes	.....	.....	41	40,736.54	41	40,736.54
Western Rivers	.....	.....	23	4,067.28	23	4,067.28
Grand total	11	8,601.54	478	435,353.34	489	443,954.88

No. 7.—*Consolidated statement showing the* **NUMBER** *and* **TONNAGE** *of* **WOODEN** *and* **IRON VESSELS** *of the* **UNITED STATES,** *June* **30, 1886.**

Class.	REGISTERED.		ENROLLED.		LICENSED.		TOTAL.	
	No.	Tons.	No.	Tons.	No.	Tons.	No.	Tons.
Sailing vessels, wood	1,580	927,520.41	10,859	1,609,604.71	5,617	62,425.27	18,056	2,599,550.39
Sailing vessels, iron	4	7,025.55	7	1,575.99	.....	.....	11	8,601.54
Steam vessels, wood	117	46,839.50	4,018	1,022,324.42	854	18,466.64	4,989	1,087,630.56
Steam vessels, iron	68	129,793.67	399	305,257.30	11	302.37	478	435,353.34
Total	1,769	1,111,179.13	15,283	2,938,762.42	6,482	81,194.28	23,534	4,131,135.83
Total wooden vessels	1,697	974,359.91	14,877	2,631,029.13	6,471	80,891.91	23,045	3,687,180.95
Total iron vessels	72	136,819.22	406	306,833.29	11	302.37	489	443,954.88
Total	1,769	1,111,179.13	15,283	2,938,762.42	6,482	81,194.28	23,534	4,131,135 83

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No. 8.—*Balance sheet of Tonnage Accounts, showing the* **INCREASE** *and* **DECREASE** *in the* **TONNAGE** *of* **REGISTERED, ENROLLED,** *and* **LICENSED VESSELS** *of the United States, from June* 30, **1885,** *to June* 30, **1886.**

Debit.	Registered.	Enrolled.	Licensed.	Total.	Credit.	Registered.	Enrolled.	Licensed.	Total.
To amount of tonnage sold to foreigners during the year ending June 30, 1886	31, 617. 00	1, 436. 10	10. 29	33, 063. 39	By amount of tonnage, as appears from general statement No. 1, for the year ending June 30, 1885	1, 287, 998. 51	2, 896, 572. 72	81, 362. 56	4, 265, 933. 79
To amount of tonnage abandoned as unfit for service during the year ending June 30, 1886	11, 431. 90	21, 469. 92	1, 080. 87	33, 982. 69	By amount of tonnage of vessels built during the year ending June 30, 1886	15, 637. 02	75, 490. 13	4, 326. 24	95, 453. 39
To amount of tonnage lost at sea during the year ending June 30, 1886	80, 792. 81	62, 699. 03	701. 86	144, 193. 70	By amount of foreign tonnage, wrecked and documented as vessels of the United States, for the year ending June 30, 1886	2, 779. 71	2, 575. 84	.....	5, 355. 55
To balance as appears by general statement No. 1 for the year ending June 30, 1886	1, 111, 179. 13	2, 938, 762. 42	81, 194. 28	4, 131, 135. 83					
To amount on account of corrections of balances	71, 394. 40	.....	2, 701. 50	74, 095. 90	By amount on account of corrections of balances	.....	49, 728. 78	.....	49, 728. 78
Total	1, 306, 415. 24	3, 024, 367. 47	85, 688. 80	4, 416, 471. 51	Total	1, 306, 415. 24	3, 024, 367. 47	85, 688. 80	4, 416, 471. 51

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No. 9.—*Balance sheet of Tonnage Accounts, showing the* **INCREASE** *and* **DECREASE** *in each* **CLASS** *of* **VESSELS** *from June 30,* **1885,** *to June 30,* **1886.**

	REGISTERED VESSELS.									
	Ships.	Barks and barkentines.	Brigs and brigantines.	Schooners.	Sloops.	Canal-boats.	Barges.	Steamers.	Total number.	TOTAL TONNAGE.
There were built	5	1	.....	12	.....	.....	2	7	27	15,637.02
There were wrecked foreign vessels documented	.....	.....	.....	.....	.....	.....	.....	2	2	2,779.71
Balance in favor of decreased registered tonnage	.....	.....	.....	.....	.....	.....	.....	.....	.....	176,819.38
Total	5	1	.....	12	.....	.....	2	9	29	195,236.11
There were sold to foreigners	15	13	3	26	3	.....	.....	5	65	31,617.00
There were abandoned as unfit for service	2	4	1	12	.....	.....	.....	2	21	11,431.90
There were lost at sea or wrecked	20	42	32	65	1	.....	.....	6	166	80,792.81
This amount on account of corrections of balances	.....	.....	.....	.....	.....	.....	.....	.....	.....	71,394.40
Total	37	59	36	103	4	.....	.....	13	252	195,236.11

	ENROLLED AND LICENSED VESSELS.									
	Ships.	Barks and barkentines.	Brigs and brigantines.	Schooners.	Sloops.	Canal-boats.	Barges.	Steamers.	Total number.	TOTAL TONNAGE.
There were built	.....	2	1	264	120	23	45	233	688	79,816.37
There were wrecked foreign vessels documented	.....	.....	.....	3	.....	.....	.....	1	4	2,575.84
This amount on account of corrections of balances	.....	.....	.....	.....	.....	.....	.....	.....	.....	47,027.28
Total	.....	2	1	267	120	23	45	234	692	129,419.49
There were sold to foreigners	.....	1	.....	11	.....	.....	.....	1	13	1,446.39
There were abandoned as unfit for service	.....	1	.....	106	46	.....	5	95	253	22,550.79
There were lost at sea or wrecked	.....	1	32	260	25	.....	8	59	385	63,400.89
Balance in favor of increased enrolled and licensed tonnage	.....	.....	.....	.....	.....	.....	.....	.....	.....	42,021.42
Total	.....	3	32	377	71	.....	13	155	651	129,419.49
The decreased registered tonnage brought down	.....	.....	.....	.....	.....	.....	.....	.....	.....	176,819.38
The increased enrolled and licensed tonnage brought down	.....	.....	.....	.....	.....	.....	.....	.....	.....	42,021.42

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No. 10.—*Statement showing the Amount of* **REGISTERED, ENROLLED,** *and* **LICENSED SAIL** *and* **STEAM TONNAGE,** *constituting the total* **MERCHANT MARINE** *of the United States, from* **1789** *to* **1886.**

YEAR ENDING—	REGISTERED VESSELS.			ENROLLED VESSELS.			LICENSED VESSELS Under 20 tons.			TOTAL MERCHANT MARINE.			Annual increase or decrease(—) per cent.
	SAIL.	STEAM.	TOTAL.	SAIL.	STEAM.	TOTAL.	SAIL.	STEAM.	TOTAL.	SAIL.	STEAM.	TOTAL.	
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	
Dec. 31, 1789	123, 893	.....	123, 893	77, 669	.....	77, 669	.....	.....	.....	201, 562	.....	201, 562	.....
1790	346, 254	.....	346, 254	132, 123	.....	132, 123	.....	.....	.....	478, 377	.....	478, 377	137. 33
1791	363, 110	.....	363, 110	139, 036	.....	139, 036	.....	.....	.....	502, 146	.....	502, 146	4. 96
1792	411, 438	.....	411, 438	153, 019	.....	153, 019	.....	.....	.....	564, 457	.....	564, 457	12. 40
1793	367, 734	.....	367, 734	143, 827	.....	143, 827	9, 203	.....	9, 203	520, 764	.....	520, 764	— 7. 74
1794	438, 863	.....	438, 863	167, 228	.....	167, 228	22, 527	.....	22, 527	628, 618	.....	628, 618	20. 71
1795	529, 471	.....	529, 471	192, 846	.....	192, 846	25, 648	.....	25, 648	747, 965	.....	747, 965	19. 00
1796	576, 733	.....	576, 733	226, 297	.....	226, 297	28, 870	.....	28, 870	831, 900	.....	831, 900	11. 22.
1797	597, 777	.....	597, 777	248, 587	.....	248, 587	30, 548	.....	30, 548	876, 912	.....	876, 912	5. 41
1798	603, 376	.....	603, 376	263, 584	.....	263, 584	31, 368	.....	31, 368	898, 328	.....	898, 328	2. 44
1799	662, 197	.....	662, 197	245, 429	.....	245, 429	31, 782	.....	31, 782	939, 408	.....	939, 408	4. 57
1800	669, 921	.....	669, 921	268, 254	.....	268, 254	34, 317	.....	34, 317	972, 492	.....	972, 492	3. 52
1801	632, 907	.....	632, 907	278, 271	.....	278, 271	36, 398	.....	36, 398	947, 576	.....	947, 576	— 2. 56
1802	560, 381	.....	560, 381	294, 111	.....	294, 111	37, 614	.....	37, 614	892, 106	.....	892, 106	— 5. 85
1803	597, 157	.....	597, 157	313, 235	.....	313, 235	38, 780	.....	38, 780	949, 172	.....	949, 172	6. 39
1804	672, 530	.....	672, 530	330, 251	.....	330, 251	39, 623	.....	39, 623	1, 042, 404	.....	1, 042, 404	1. 00
1805	749, 341	.....	749, 341	350, 743	.....	350, 743	40, 283	.....	40, 283	1, 140, 367	.....	1, 140, 367	9. 40
1806	808, 285	.....	808, 285	361, 059	.....	361, 059	39, 393	.....	39, 393	1, 208, 737	.....	1, 208, 737	5. 99
1807	848, 307	.....	848, 307	379, 787	.....	379, 787	40, 454	.....	40, 454	1, 268, 548	.....	1, 268, 548	4. 95
1808	769, 054	.....	769, 054	432, 006	.....	432, 006	41, 535	.....	41, 535	1, 242, 595	.....	1, 242, 595	— 2. 04
1809	910, 059	.....	910, 059	398, 184	.....	398, 184	42, 039	.....	42, 039	1, 350, 282	.....	1, 350, 282	8. 66
1810	964, 269	.....	984, 269	397, 704	.....	397, 704	42, 810	.....	42, 810	1, 424, 783	.....	1, 424, 783	5. 51
1811	768, 852	.....	768, 852	420, 674	.....	420, 674	42, 976	.....	42, 976	1, 232, 502	.....	1, 232, 502	—13. 49
1812	760, 624	.....	760, 624	465, 945	.....	465, 945	43, 428	.....	43, 428	1, 269, 997	.....	1, 269, 997	2. 95
1813	674, 853	.....	674, 853	445, 449	.....	445, 449	46, 326	.....	46, 326	1, 166, 628	.....	1, 166, 628	— 8. 14
1814	674, 633	.....	674, 633	435, 139	.....	435, 139	49, 437	.....	49, 437	1, 159, 209	.....	1, 159, 209	— 0. 63
1815	854, 295	.....	851, 295	462, 807	.....	462, 807	51, 026	.....	51, 026	1, 368, 128	.....	1, 368, 128	18. 02
1816	800, 760	.....	800, 760	519, 026	.....	519, 026	52, 433	.....	52, 433	1, 372, 219	.....	1, 372, 219	0. 29
1817	809, 725	.....	809, 725	535, 798	.....	535, 798	54, 389	.....	54, 389	1, 399, 912	.....	1, 399, 912	2. 02
1818	606, 089	.....	606, 089	562, 307	.....	562, 307	56, 789	.....	56, 789	1, 225, 185	.....	1, 225, 185	—12. 48
1819	612, 930	.....	612, 930	589, 288	.....	589, 288	58, 534	.....	58, 534	1, 260, 752	.....	1, 260, 752	2. 90
1820	619, 048	.....	619, 048	600, 977	.....	600, 977	60, 142	.....	60, 142	1, 280, 167	.....	1, 280, 167	1. 54
1821	619, 896	.....	619, 896	612, 712	.....	612, 712	66, 350	.....	66, 350	1, 298, 958	.....	1, 298, 958	1. 47
1822	628, 150	.....	628, 150	634, 619	.....	634, 619	61, 930	.....	61, 930	1, 324, 699	.....	1, 324, 699	1. 98
1823	639, 921	.....	639, 921	669, 156	24, 879	634, 035	62, 610	.....	62, 610	1, 311, 687	24, 879	1, 336, 566	0. 89
1824	669, 973	.....	669, 973	636, 032	21, 610	657, 642	61, 548	.....	61, 548	1, 367, 553	21, 610	1, 389, 163	3. 94

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	1825	700,788	.....	700,788	634,836	23,061	657,899	64,424	.....	64,424	1,400,050	23,061	1,423,111	2.44
	1826	737,978	.....	737,978	606,123	34,059	730,182	66,031	.....	66,031	1,500,132	34,059	1,534,191	7.80
	1827	747,170	.....	747,170	766,788	40,198	806,986	66,451	.....	66,451	1,580,409	40,198	1,620,607	5.63
	1828	812,619	.....	812,619	822,753	39,418	862,171	66,602	.....	66,602	1,701,974	39,418	1,741,392	7.45
	1829	650,143	.....	650,143	534,320	54,037	588,357	22,298	.....	22,298	1,206,761	54,037	1,260,798	—27.60
	1830	575,056	1,419	576,475	528,394	63,053	591,447	23,854	.....	23,854	1,127,304	64,472	1,191,776	— 5.47
	1831	619,575	877	620,452	551,449	68,568	620,087	27,377	.....	27,377	1,198,401	69,445	1,267,846	6.38
	1832	686,809	181	686,990	633,056	90,638	723,689	28,771	.....	28,771	1,348,686	90,814	1,439,450	13.53
	1833	749,482	545	750,027	723,890	101,306	825,196	30,928	.....	30,928	1,504,300	101,851	1,606,151	11.59
	1834	857,098	340	857,438	746,908	122,474	869,382	32,087	.....	32,087	1,636,093	122,814	1,758,907	9.51
Sept. 30,	1835 (nine months)	885,482	340	885,822	784,138	122,474	906,612	32,507	.....	32,507	1,702,127	122,814	1,824,941	3.75
	1836	897,321	454	897,775	807,425	145,102	952,527	31,800	.....	31,800	1,736,546	145,556	1,882,102	8.18
	1837	809,343	1,104	810,447	897,350	153,661	1,051,011	35,228	.....	35,228	1,741,921	154,765	1,896,686	0.77
	1838	819,801	2,791	822,592	943,367	190,632	1,133,999	39,049	.....	39,049	1,802,217	193,423	1,995,640	5.22
	1839	829,096	5,149	834,245	1,032,023	189,879	1,221,902	40,332	.....	40,332	1,901,451	195,028	2,096,479	5.03
	1840	895,610	4,155	899,765	1,042,676	198,184	1,240,860	40,139	.....	40,139	1,978,425	202,339	2,180,764	4.02
	1841	945,057	746	945,803	973,571	174,342	1,147,913	37,028	.....	37,028	1,955,656	175,088	2,130,744	— 2.30
	1842	970,658	4,701	975,359	859,619	225,050	1,084,669	32,363	.....	32,363	1,862,640	229,751	2,092,391	— 1.80
June 30,	1843 (nine months)	1,003,932	5,373	1,009,305	883,534	231,494	1,115,028	34,270	.....	34,270	1,921,736	236,867	2,158,603	3.16
	1844	1,061,855	6,910	1,068,765	908,268	263,270	1,173,538	37,703	.....	37,703	2,007,916	272,180	2,280,096	5.63
	1845	1,088,680	6,492	1,095,172	962,817	319,527	1,282,344	39,486	.....	39,486	2,090,983	326,019	2,417,002	6.00
	1846	1,124,000	6,287	1,130,287	1,057,684	341,606	1,399,290	32,508	.....	32,508	2,214,192	347,893	2,562,085	6.00
	1847	1,235,682	5,631	1,241,313	1,155,042	399,210	1,554,252	43,481	.....	43,481	2,434,205	404,841	2,839,046	10.81
	1848	1,344,819	16,068	1,360,887	1,335,809	411,823	1,747,632	45,523	.....	45,523	2,726,151	427,891	3,154,042	11.09
	1849	1,418,072	20,870	1,438,942	1,406,710	441,525	1,848,235	46,839	.....	46,839	2,871,621	462,395	3,334,016	5.71
	1850	1,540,769	44,942	1,586,711	1,418,550	481,005	1,899,555	50,188	.....	50,188	3,009,507	525,947	3,535,454	6.04
	1851	1,663,917	62,390	1,726,307	1,471,116	521,217	1,992,333	53,799	.....	53,799	3,188,832	583,607	3,772,439	6.70
	1852	1,819,744	79,704	1,899,448	1,619,691	563,536	2,183,227	55,765	.....	55,765	3,495,200	643,240	4,138,440	9.70
	1853	2,013,154	90,520	2,103,674	1,728,524	514,098	2,242,622	60,714	.....	60,714	3,802,392	604,618	4,407,010	6.49
	1854	2,238,783	95,036	2,333,819	1,829,564	581,571	2,411,135	57,948	.....	57,948	4,126,295	676,607	4,802,902	8.96
	1855	2,420,091	115,045	2,535,136	1,900,491	655,240	2,615,731	61,134	.....	61,134	4,441,716	770,285	5,212,001	8.52
	1856	2,401,688	89,715	2,491,403	1,754,524	583,362	2,337,886	42,364	.....	42,364	4,198,576	673,077	4,871,653	— 6.53
	1857	2,377,095	86,873	2,463,968	1,814,459	618,911	2,433,370	43,505	.....	43,505	4,235,059	705,784	4,940,843	1.42
	1858	2,421,715	78,027	2,499,742	1,850,723	651,363	2,502,086	47,980	.....	47,980	4,320,418	729,390	5,049,808	2.20
	1859	2,414,654	92,748	2,507,402	1,910,962	676,005	2,586,967	50,669	.....	50,669	4,376,285	768,753	5,145,038	1.90
	1860	2,448,941	97,296	2,546,237	1,982,297	770,641	2,752,938	54,693	.....	54,093	4,485,031	867,937	5,353,868	4.06
	1861	2,540,020	102,608	2,642,628	2,064,803	774,596	2,839,399	57,786	.....	57,786	4,662,609	877,204	5,539,813	3.47
	1862	2,177,253	113,998	2,291,251	2,175,540	596,465	2,772,005	48,908	.....	48,908	4,401,701	710,463	5,112,164	— 7.72
	1863	1,892,899	133,215	2,026,114	2,633,889	442,304	3,076,193	52,749	.....	52,749	4,579,537	575,519	5,155,056	0.84
	1864	1,459,888	122,006	1,581,894	2,496,517	855,954	3,352,471	52,035	.....	52,035	4,008,440	977,960	4,986,400	— 3.27
	1865	1,504,575	98,008	1,602,583	2,484,962	969,131	3,454,093	40,106	.....	40,106	4,029,643	1,067,139	5,096,782	2.21
	1866	1,294,637	198,289	1,492,926	1,893,314	885,223	2,778,537	39,315	.....	39,315	3,227,266	1,083,512	4,310,778	—15.42
	1867	1,369,917	198,115	1,568,032	1,701,593	993,765	2,695,358	41,097	.....	41,097	3,112,607	1,191,880	4,304,487	— 0.14
	1868	1,343,793	221,939	1,565,732	1,758,025	975,142	2,733,167	50,526	2,334	52,860	3,152,314	1,199,415	4,351,759	1.10
	1869	1,353,170	213,252	1,566,422	1,638,692	887,401	2,526,093	49,211	2,915	52,126	3,041,073	1,103,568	4,144,641	4.76
	1870	1,324,256	192,544	1,516,800	1,798,418	879,522	2,677,940	48,738	3,029	51,767	3,171,412	1,075,095	4,246,507	2.41
	1871	1,244,228	180,914	1,425,142	1,901,731	903,543	2,805,274	49,011	3,180	52,191	3,194,970	1,087,637	4,282,607	0.85
	1872	1,232,982	177,666	1,410,648	2,041,347	929,962	2,971,309	51,865	3,925	55,790	3,326,194	1,111,553	4,437,747	3.62
	1873	1,229,965	193,423	1,423,288	2,257,498	958,417	3,215,915	52,221	4,603	56,824	3,539,584	1,156,443	4,696,027	5.82
	1874	1,233,678	195,245	1,428,923	2,326,577	985,569	3,312,146	54,787	4,796	59,583	3,615,042	1,185,610	4,800,652	2.23
	1875	1,362,138	191,689	1,553,827	2,266,584	971,806	3,238,390	56,342	5,173	61,515	3,685,064	1,168,668	4,853,732	1.10
	1876	1,394,594	198,227	1,592,821	1,636,504	968,300	2,024,804	55,988	5,845	61,833	3,107,086	1,172,372	4,279,458	—11.83

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10.—*Statement showing the Amount of* **REGISTERED, ENROLLED** *and* **LICENSED SAIL** *and* **STEAM TONNAGE,** *constituting the total* **MERCHANT MARINE** *of the United States, from* **1789** *to* **1886**—Continued.

YEAR ENDING—	REGISTERED VESSELS.			ENROLLED VESSELS.			LICENSED VESSELS Under 20 tons.			TOTAL MERCHANT MARINE.			Annual increase or decrease (—) per cent.
	SAIL.	STEAM.	TOTAL.	SAIL.	STEAM.	TOTAL.	SAIL.	STEAM.	TOTAL.	SAIL.	STEAM.	TOTAL.	
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	
June 30, 1877	1,421,060	190,133	1,611,193	1,592,834	975,033	2,567,867	57,509	6,031	63,540	3,071,403	1,171,197	4,242,600	— 0.86
1878	1,458,209	170,838	1,629,047	1,528,979	990,382	2,519,361	57,899	6,458	64,357	3,045,087	1,167,678	4,212,765	— 0.70
1879	1,335,210	156,323	1,491,533	1,598,793	1,012,810	2,611,603	59,426	7,039	66,465	2,993,429	1,176,172	4,169,601	— 1.02
1880	1,206,206	146,604	1,352,810	1,590,766	1,058,587	2,649,353	59,504	6,367	65,871	2,856,476	1,211,558	4,068,034	— 2.43
1881	1,182,817	152,769	1,335,586	1,551,246	1,105,958	2,657,204	58,673	6,274	64,947	2,792,736	1,264,998	4,057,734	— 0.25
1882	1,137,724	154,570	1,292,294	1,612,837	1,194,383	2,807,220	59,545	6,873	66,418	2,810,107	1,355,826	4,165,933	2.66
1883	1,130,190	171,905	1,302,095	1,630,831	1,227,739	2,858,570	61,272	13,550	74,822	2,822,293	1,413,194	4,235,487	1.67
1884	1,120,033	184,188	1,304,221	1,623,196	1,263,332	2,886,528	62,091	18,389	80,480	2,805,320	1,465,909	4,271,229	0.84
1885	1,101,593	186,406	1,287,999	1,600,578	1,289,995	2,896,573	62,846	18,516	81,362	2,771,017	1,494,917	4,265,934	— 0.12
1886	934,546	176,633	1,111,179	1,611,181	1,327,582	2,938,763	62,425	18,769	81,194	2,608,152	1,522,984	4,131,136	— 3.16

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No. 11.—*Statement showing the Number and Tonnage of* **SAILING VESSELS, STEAM VESSELS, CANAL-BOATS,** *and* **BARGES** *in each* **CUSTOMS DISTRICT** *of the United States, June* 30, **1886.**

STATES AND CUSTOMS DISTRICTS IN WHICH DOCUMENTED.	SAILING VESSELS.		STEAM VESSELS.		CANAL-BOATS.		BARGES.		TOTAL.	
	No.	Tons.	No.	Tons.	No.	Tons.	No.	Tons.	No.	Tons.
THE ATLANTIC AND GULF COASTS.										
MAINE.										
Passamaquoddy	162	14,742.08	11	3,510.53					173	18,252.61
Machias	180	17,763.31	5	122.70					185	17,886.01
Frenchman's Bay	234	15,508.62	7	493.91					241	16,002.53
Castine	231	13,023.79	3	55.05					234	13,078.84
Bangor	149	20,593.46	12	842.11					161	21,435.57
Belfast	230	41,262.53	2	92.00					232	41,354.53
Waldoborough	335	69,579.51	4	792.54					339	70,372.05
Wiscasset	139	7,511.51	2	105.68					141	7,617.19
Bath	228	136,139.19	27	3,502.20			4	2,272.31	259	141,913.70
Portland and Falmouth	326	93,025.97	39	12,279.58					365	105,305.55
Saco	16	1,959.63	3	231.07					19	2,190.70
Kennebunk	31	3,384.67	1	14.89					32	3,399.56
York	10	329.67							10	329.67
Total	2,271	434,823.94	116	22,042.26			4	2,272.31	2,391	459,138.51
NEW HAMPSHIRE.										
Portsmouth	58	10,033.46	7	388.51					65	10,421.97
MASSACHUSETTS.										
Newburyport	48	15,585.41	14	893.23			2	86.86	64	16,565.50
Gloucester	486	32,955.18	8	273.04					494	33,228.22
Salem and Beverly	34	2,148.50	5	170.02					39	2,318.52
Marblehead	39	2,855.33	1	10 91					40	2,866.24
Boston and Charlestown	598	219,022.20	101	43,465.08					699	262,487.28
Plymouth	30	1,356.24	1	344.11					31	1,700.35
Barnstable	306	28,862.12	1	46.27					307	28,908.39
Nantucket	15	462.56	1	578.37					16	1,040.93
Edgartown	20	981.34							20	981.34
New Bedford	188	33,091.58	14	2,836.49					202	35,928.07
Fall River	70	24,473.80	20	21,807.56			9	3,663.76	99	49,945.12
Total	1,834	361,794.26	166	70,425.08			11	3,750.62	2,011	435,969.96

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No. 10.—*Statement showing the Amount of* **REGISTERED, ENROLLED** *and* **LICENSED SAIL** *and* **STEAM TONNAGE,** *constituting the total* **MERCHANT MARINE** *of the United States, from* **1789** *to* **1886**—Continued.

YEAR ENDING—	REGISTERED VESSELS.			ENROLLED VESSELS.			LICENSED VESSELS Under 20 tons.			TOTAL MERCHANT MARINE.			Annual increase or decrease (—) per cent.
	SAIL.	STEAM.	TOTAL.	SAIL.	STEAM.	TOTAL.	SAIL.	STEAM.	TOTAL.	SAIL.	STEAM.	TOTAL.	
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	
June 30, 1877	1,421,060	190,133	1,611,193	1,592,834	975,033	2,567,867	57,509	6,031	63,540	3,071,403	1,171,197	4,242,600	— 0.86
1878	1,458,209	170,838	1,629,047	1,528,979	990,382	2,519,361	57,899	6,458	64,357	3,045,087	1,167,678	4,212,765	— 0.70
1879	1,335,210	156,323	1,491,533	1,598,793	1,012,810	2,611,603	59,426	7,039	66,465	2,993,429	1,176,172	4,169,601	— 1.02
1880	1,206,206	146,604	1,352,810	1,590,766	1,058,587	2,649,353	59,504	6,367	65,871	2,856,476	1,211,558	4,068,034	— 2.43
1881	1,182,817	152,769	1,335,586	1,551,246	1,105,958	2,657,204	58,673	6,274	64,947	2,792,736	1,264,998	4,057,734	— 0.25
1882	1,137,724	154,570	1,292,294	1,612,837	1,194,383	2,807,220	59,545	6,873	66,418	2,810,107	1,355,826	4,165,933	2.66
1883	1,130,190	171,905	1,302,095	1,630,831	1,227,739	2,858,570	61,272	13,550	74,822	2,822,293	1,413,194	4,235,487	1.67
1884	1,120,033	184,188	1,304,221	1,623,196	1,263,332	2,886,528	62,091	18,389	80,480	2,805,320	1,465,909	4,271,229	0.84
1885	1,101,593	186,406	1,287,999	1,606,578	1,289,995	2,896,573	62,846	18,516	81,362	2,771,017	1,494,917	4,265,934	— 0.12
1886	934,546	176,633	1,111,179	1,611,181	1,327,582	2,938,763	62,425	18,769	81,194	2,608,152	1,522,984	4,131,136	— 3.16

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No. 11.—*Statement showing the Number and Tonnage of* **SAILING VESSELS, STEAM VESSELS, CANAL-BOATS,** *and* **BARGES** *in each* **CUSTOMS DISTRICT** *of the United States, June 30,* **1886.**

STATES AND CUSTOMS DISTRICTS IN WHICH DOCUMENTED.	SAILING VESSELS.		STEAM VESSELS.		CANAL-BOATS.		BARGES.		TOTAL.	
	No.	Tons.	No.	Tons.	No.	Tons.	No.	Tons.	No.	Tons.
THE ATLANTIC AND GULF COASTS.										
MAINE.										
Passamaquoddy	162	14,742.08	11	3,510.53					173	18,252.61
Machias	180	17,763.31	5	122.70					185	17,886.01
Frenchman's Bay	234	15,508.62	7	493.91					241	16,002.53
Castine	231	13,023.79	3	55.05					234	13,078.84
Bangor	149	20,593.46	12	842.11					161	21,435.57
Belfast	230	41,262.53	2	92.00					232	41,354.53
Waldoborough	335	69,579.51	4	792.54					339	70,372.05
Wiscasset	139	7,511.51	2	105.68					141	7,617.19
Bath	228	136,139.19	27	3,502.20			4	2,272.31	259	141,913.70
Portland and Falmouth	326	93,025.97	39	12,279.58					365	105,305.55
Saco	16	1,950.63	3	231.07					19	2,190.70
Kennebunk	31	3,384.67	1	14.89					32	3,399.56
York	10	329.67							10	329.67
Total	2,271	434,823.91	116	22,042.26			4	2,272.31	2,391	459,138.51
NEW HAMPSHIRE.										
Portsmouth	58	10,033.46	7	388.51					65	10,421.97
MASSACHUSETTS.										
Newburyport	48	15,585.41	14	893.23			2	86.86	64	16,565.50
Gloucester	486	32,955.18	8	273.04					494	33,228.22
Salem and Beverly	34	2,148.50	5	170.02					39	2,318.52
Marblehead	39	2,855.33	1	10.91					40	2,866.24
Boston and Charlestown	598	219,022.20	101	43,465.08					699	262,487.28
Plymouth	30	1,356.24	1	344.11					31	1,700.35
Barnstable	306	28,862.12	1	46.27					307	28,908.39
Nantucket	15	462.56	1	578.37					16	1,040.93
Edgartown	20	961.34							20	961.34
New Bedford	188	33,091.58	14	2,836.49					202	35,928.07
Fall River	70	24,473.80	20	21,807.56			9	3,663.76	99	49,945.12
Total	1,834	361,794.26	166	70,425.08			11	3,750.62	2,011	435,969.96

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No. 11.—*Statement showing the Number and Tonnage of* **SAILING VESSELS, STEAM VESSELS, CANAL-BOATS,** *and* **BARGES** *in each* **CUSTOMS DISTRICT** *of the United States, June* 30, **1886**—Continued.

STATES AND CUSTOMS DISTRICTS IN WHICH DOCUMENTED.	SAILING VESSELS.		STEAM VESSELS.		CANAL-BOATS.		BARGES.		TOTAL.	
	No.	Tons.	No.	Tons.	No.	Tons.	No.	Tons.	No.	Tons.
THE ATLANTIC AND GULF COASTS—Continued.										
RHODE ISLAND.										
Providence	97	12,463.97	32	19,135.74	.....	.....	2	689.15	131	32,288.86
Bristol and Warren	27	1,328.71	3	124.74	.....	.....	.....	.....	30	1,453.45
Newport	90	3,500.32	14	1,867.64	.....	.....	.....	.....	104	5,367.96
Total	214	17,293.00	49	21,128.12	.....	.....	2	689.15	265	39,110.27
CONNECTICUT.										
Stonington	94	4,191.72	11	2,256.43	.....	.....	.....	.....	105	6,448.15
New London	121	12,360.32	36	16,105.57	.....	.....	15	4,002.04	172	32,467.93
Middletown	56	6,068.44	18	8,886.90	.....	.....	21	4,132.75	95	14,088.09
New Haven	103	19,229.10	48	8,543.79	.....	.....	124	17,557.60	275	45,330.49
Fairfield	130	5,569.18	40	5,607.22	2	251.69	1	148.50	173	11,576.59
Total	504	47,418.76	153	36,399.91	2	251.69	161	25,840.89	820	109,911.25
NEW YORK.										
New York	2,250	449,223.01	1,030	354,991.07	199	20,188.78	476	94,260.86	3,955	918,663.72
Sag Harbor	204	10,767.43	27	2,372.59	.....	.....	1	781.80	232	13,921.32
Total	2,454	459,990.44	1,057	357,363.66	199	20,188.78	477	95,042.16	4,187	932,585.04
NEW JERSEY.										
Newark	37	3,134.29	34	3,634.39	.....	.....	.....	.....	71	6,768.68
Perth Amboy	286	14,490.29	40	7,297.89	1	278.69	50	14,408.68	377	36,475.55
Little Egg Harbor	50	3,950.31	3	177.21	.....	.....	.....	.....	53	4,127.52
Great Egg Harbor	127	16,320.98	6	460.49	.....	.....	.....	.....	133	16,787.47
Bridgeton	426	19,601.05	5	679.16	.....	.....	.....	.....	431	20,280.21
Burlington	32	2,446.72	11	1,130.86	.....	.....	.....	.....	43	3,577.58
Total	958	59,949.64	99	13,380.00	1	278.69	50	14,408.68	1,108	88,017.01
PENNSYLVANIA.										
Philadelphia	526	143,101.89	266	74,837.06	44	5,821.86	33	7,300.74	869	231,121.55

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DELAWARE.										
Delaware	149	12,669.68	26	4,061.51					175	16,731.19
MARYLAND.										
Baltimore	1,058	66,000.71	165	54,120.07			9	2,207.58	1,232	122,328.36
Annapolis	129	2,881.63	1	106.15					130	2,987.78
Eastern Maryland	867	19,406.96	4	208.28					871	19,615.24
Total	2,054	88,239.30	170	54,434.50			9	2,207.58	2,233	144,881.38
DISTRICT OF COLUMBIA.										
Georgetown	35	937.32	31	8,636.09			1	508.36	67	10,081.77
VIRGINIA.										
Alexandria	66	4,456.80	10	446.61					76	4,903.41
Tappahannock	143	3,882.72	3	169.76					146	4,052.48
Richmond	42	5,614.01	16	1,027.37					58	6,641.38
Petersburg	4	45.09	4	210.48					8	255.57
Yorktown	209	3,468.81	4	819.79					213	4,288.60
Norfolk and Portsmouth	367	11,371.77	58	5,005.18					425	16,376.95
Cherrystone	336	5,602.33	2	135.67					338	5,738.00
Total	1,167	34,441.53	97	7,814.86					1,264	42,256.39
NORTH CAROLINA.										
Albemarle	44	578.18	27	2,304.81					71	2,882.99
Pamlico	98	1,927.69	16	918.68					114	2,846.37
Beaufort	85	1,498.21	2	99.46					87	1,597.67
Wilmington	46	4,270.57	13	1,092.25					59	5,362.82
Total	273	8,274.65	58	4,415.20					331	12,689.85
SOUTH CAROLINA.										
Georgetown	8	966.64	14	972.45					22	1,939.09
Charleston	134	3,599.70	26	4,637.00					160	8,236.70
Beaufort	15	829.40	9	620.09					24	1,449.49
Total	157	5,395.74	49	6,229.54					206	11,625.28
GEORGIA.										
Savannah	56	3,124.64	34	22,455.57					90	25,580.21
Brunswick	23	4,627.68	14	1,337.60					37	5,965.28
Saint Mary's	3	882.97	1	34.27					4	917.24
Total	82	8,635.29	49	23,827.44					131	32,462.73
FLORIDA.										
Fernandina	12	2,920.36	3	389.01					15	3,309.37

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No. 11.—*Statement showing the Number and Tonnage of* **SAILING VESSELS, STEAM VESSELS, CANAL-BOATS,** *and* **BARGES** *in each* **CUSTOMS DISTRICT** *of the United States, June 30,* **1886**—Continued.

STATES AND CUSTOMS DISTRICTS IN WHICH DOCUMENTED.	SAILING VESSELS.		STEAM VESSELS.		CANAL-BOATS.		BARGES.		TOTAL.	
	No.	Tons.	No.	Tons.	No.	Tons.	No.	Tons.	No.	Tons.
THE ATLANTIC AND GULF COASTS—Continued.										
FLORIDA—continued.										
Saint John's	23	1,934.74	52	4,258.05	.....	.....	.....	.....	75	6,192.79
Saint Augustine	5	55.96	3	276.41	.....	.....	.....	.....	8	332.37
Key West	156	3,845.90	17	4,005.18	.....	.....	.....	.....	173	7,851.08
Saint Mark's	38	403.39	10	721.65	.....	.....	.....	.....	48	1,125.04
Apalachicola	28	609.58	11	1,241.89	.....	.....	.....	.....	39	1,851.47
Pensacola	114	11,510.99	19	1,538.41	.....	.....	.....	.....	133	13,049.40
Total	376	21,280.92	115	12,430.60	.....	.....	.....	.....	491	33,711.52
ALABAMA.										
Mobile	75	4,832.42	49	5,824.37	.....	.....	8	326.25	132	10,983.04
MISSISSIPPI.										
Pearl River	142	5,091.96	9	860.54	.....	.....	.....	.....	151	5,952.50
LOUISIANA.										
New Orleans	325	11,414.21	27	31,567.07	.....	.....	.....	.....	352	42,981.28
Teche	71	1,853.38	30	1,345.52	.....	.....	.....	.....	101	2,698.90
Total	396	12,767.59	57	32,912.59	.....	.....	.....	.....	453	45,680.18
TEXAS.										
Galveston	151	4,335.17	34	5,458.50	.....	.....	5	810.17	190	10,603.84
Saluria	23	302.86	.....	.....	.....	.....	.....	.....	23	302.86
Corpus Christi	29	921.45	2	157.80	.....	.....	2	222.90	33	1,302.15
Brazos de Santiago	9	174.71	3	273.61	.....	.....	.....	.....	12	448.32
Total	212	5,734.19	39	5,889.91	.....	.....	7	1,033.07	258	12,657.17
Total Atlantic and Gulf Coasts	13,937	1,742,765.98	2,662	763,301.75	246	26,541.02	763	153,379.81	17,608	2,685,988.56

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THE PACIFIC COAST.										
CALIFORNIA.										
San Diego	11	168.84	2	34.16					13	203.00
Wilmington	10	611.77	3	307.93					13	919.70
San Francisco	650	141,285.69	183	102,178.08					833	243,413.77
Humboldt	16	2,524.65	10	1,071.81					26	3,596.46
Total	687	144,540.95	198	103,591.98					885	248,132.93
OREGON.										
Southern Oregon	3	154.76	11	608.31					14	763.07
Yaquina			6	1,406.59					6	1,406.59
Oregon	34	655.03	34	2,161.17					68	2,816.20
Willamette	14	7,506.58	81	38,341.01			8	5,972.98	103	51,820.57
Total	51	8,316.37	132	42,517.08			8	5,972.98	191	56,806.43
WASHINGTON.										
Puget Sound	91	31,909.13	86	10,211.24					177	42,120.37
ALASKA.										
Alaska	16	259.69	4	365.29					20	624.98
Total Pacific Coast	845	185,026.14	420	156,685.59			8	5,972.98	1,273	347,684.71
THE NORTHERN LAKES.										
VERMONT.										
Vermont	12	995.67	9	2,333.92	10	989.18			31	4,318.77
NEW YORK.										
Champlain	28	1,749.65	13	1,197.72	680	58,505.18	7	927.38	728	62,379.93
Oswegatchie	9	939.77	17	1,058.73			15	3,152.42	41	5,150.92
Cape Vincent	31	2,629.85	20	1,410.71					51	4,040.56
Oswego	84	9,322.99	19	1,897.57	75	9,565.04	1	201.05	129	20,986.65
Genesee	5	988.19	12	1,034.63	1	128.01			18	2,150.83
Niagara	11	3,035.59	7	1,469.99					18	4,505.58
Buffalo Creek	36	18,312.87	132	78,954.00	22	2,890.24	25	6,478.56	215	106,635.67
Dunkirk	1	24.16			1	124.15			2	148.31
Total	155	37,003.07	220	87,023.35	779	71,212.62	48	10,759.41	1,202	205,998.45
PENNSYLVANIA.										
Erie	8	3,421.34	29	24,720.63					37	28,141.97

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No. 11.—*Statement showing the Number and Tonnage of* **SAILING VESSELS, STEAM VESSELS, CANAL-BOATS,** *and* **BARGES** *in each* **CUSTOMS DISTRICT** *of the United States, June 30,* **1886**—Continued.

STATES AND CUSTOMS DISTRICTS IN WHICH DOCUMENTED.	SAILING VESSELS.		STEAM VESSELS.		CANAL-BOATS.		BARGES.		TOTAL.	
	No.	Tons.	No.	Tons.	No.	Tons.	No.	Tons.	No.	Tons.
THE NORTHERN LAKES—Continued.										
OHIO.										
Cuyahoga	108	46,327.55	85	54,792.13			1	372.88	194	101,492.56
Sandusky	45	14,410.11	36	9,319.60			1	289.90	82	24,019.61
Miami	23	9,473.02	30	6,710.48			4	1,679.40	57	17,862.90
Total	176	70,210.68	151	70,822.21			6	2,342.18	333	143,375.07
MICHIGAN.										
Detroit	154	41,407.48	140	55,879.98			11	2,858.88	305	100,146.34
Huron	188	42,737.86	138	34,273.37			31	9,281.02	357	86,292.25
Superior	26	6,269.32	76	9,537.84					102	15,807.16
Michigan	137	13,937.31	171	17,157.75			4	780.62	312	31,875.68
Total	505	104,351.97	525	116,848.94			46	12,920.52	1,076	234,121.43
ILLINOIS.										
Chicago	136	15,719.45	216	51,010.77					352	66,730.22
WISCONSIN.										
Milwaukee	242	50,528.95	110	28,523.37					352	79,052.32
MINNESOTA.										
Duluth	1	88.03	20	624.61			1	109.70	23	822.34
Total Northern Lakes	1,285	282,319.16	1,280	381,907.80	789	72,201.80	101	26,131.81	3,405	762,560.57
THE WESTERN RIVERS.										
LOUISIANA.										
New Orleans			125	20,395.66					125	20,395.66
MISSISSIPPI.										
Natchez			3	302.23					3	302.23

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Vicksburg			30	2,555.51				30	2,555.51
Total			33	2,858.74				33	2,858.74
TENNESSEE.									
Memphis			70	13,774.98				70	13,774.98
Nashville			19	4,088.45				19	4,088.45
Chattanooga			15	2,665.32				15	2,665.32
Total			104	20,528.75				104	20,528.75
KENTUCKY.									
Paducah			23	3,496.24				23	3,496.24
Louisville			57	14,997.73				57	14,997.73
Total			80	18,493.97				80	18,493.97
MISSOURI.									
Saint Louis			129	49,788.90			123	111,789.64	252	161,478.54
Kansas City			13	1,159.54			1	25.81	14	1,185.35
Saint Joseph			4	687.55					4	687.55
Total			146	51,585.99			124	111,765.45	270	163,351.44
NEBRASKA.									
Omaha			22	3,696.56					22	3,696.56
IOWA.									
Burlington			45	4,908.84			4	341.91	49	5,250.75
Dubuque			24	4,564.89					24	4,564.89
Total			69	9,473.73			4	341.91	73	9,815.64
MINNESOTA.									
Minnesota			46	6,431.21			13	1,578.94	59	8,010.15
WISCONSIN.									
La Crosse			41	3,383.25					41	3,383.25
ILLINOIS.									
Galena			23	2,542.81			1	35.00	24	2,577.81
INDIANA.									
Evansville			55	8,198.62					55	8,198.62

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No. 11.—*Statement showing the Number and Tonnage of* **SAILING VESSELS, STEAM VESSELS, CANAL-BOATS,** *and* **BARGES** *in each* **CUSTOMS DISTRICT** *of the United States, June* 30, **1886**—Continued.

STATES AND CUSTOMS DISTRICTS IN WHICH DOCUMENTED.	SAILING VESSELS.		STEAM VESSELS.		CANAL-BOATS.		BARGES.		TOTAL.	
	No.	Tons.	No.	Tons.	No.	Tons.	No.	Tons.	No.	Tons.
THE WESTERN RIVERS—Continued.										
OHIO.										
Cincinnati			106	31,594.03					106	31,594.03
WEST VIRGINIA.										
Wheeling			101	10,475.45					101	10,475.45
PENNSYLVANIA.										
Pittsburgh	1	91.93	154	31,489.99					155	31,581.92
Total Western Rivers	1	91.93	1,105	221,088.76			142	113,721.30	1,248	334,901.99
SUMMARY.										
Atlantic and Gulf Coasts	13,987	1,742,765.98	2,662	763,301.75	246	26,541.02	763	153,379.81	17,608	2,685,988.56
Pacific Coast	845	185,026.14	420	156,685.59			8	5,972.98	1,273	347,684.71
Northern Lakes	1,235	282,319.16	1,280	381,907.80	789	72,201.80	101	26,181.81	3,405	762,560.57
Western Rivers	1	91.93	1,105	221,088.76			142	113,721.30	1,248	334,901.99
Grand total	16,018	2,210,203.21	5,467	1,522,983.90	1,035	98,742.82	1,014	299,205.90	23,534	4,131,135.83

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No. 19.—*Statement showing the Number and Tonnage of* **SAILING VESSELS, STEAM VESSELS, CANAL-BOATS,** *and* **BARGES** *in each of the United States, June 30,* **1886.**

STATES AND TERRITORIES IN WHICH DOCUMENTED.	SAILING VESSELS.		STEAM VESSELS.		CANAL-BOATS.		BARGES.		TOTAL.	
	No.	Tons.	No.	Tons.	No.	Tons.	No.	Tons.	No.	Tons.
Maine	2,271	434,823.94	116	22,042.26	.....	.....	4	2,272.31	2,391	459,138.51
New Hampshire	58	10,033.46	7	388.51	.....	.....	.....	.....	65	10,421.97
Vermont	12	995.67	9	2,333.92	10	989.18	.....	.....	31	4,318.77
Massachusetts	1,884	361,794.26	166	70,425.08	.....	.....	11	3,750.62	2,011	435,969.96
Rhode Island	214	17,293.00	49	21,128.12	.....	.....	2	689.15	265	39,110.27
Connecticut	504	47,418.76	153	36,399.91	2	251.69	161	25,840.89	820	109,911.25
New York	2,609	496,992.51	1,277	444,387.01	978	91,401.40	525	105,801.57	5,389	1,138,583.49
New Jersey	958	59,949.64	99	13,880.00	1	278.69	50	14,408.68	1,108	88,017.01
Pennsylvania	535	146,675.16	449	131,047.68	44	5,821.86	33	7,300.74	1,061	290,845.44
Delaware	149	12,669.68	26	4,061.51	.....	.....	.....	.....	175	16,731.19
Maryland	2,054	88,239.30	170	54,434.50	.....	.....	9	2,207.58	2,233	144,881.38
District of Columbia	35	937.32	31	8,636.09	.....	.....	1	508.36	67	10,081.77
Virginia	1,167	34,441.58	97	7,814.86	.....	.....	.....	.....	1,264	42,256.39
North Carolina	273	8,274.65	58	4,415.20	.....	.....	.....	.....	331	12,689.85
South Carolina	157	5,395.74	49	6,229.54	.....	.....	.....	.....	206	11,625.28
Georgia	82	8,635.29	49	23,827.44	.....	.....	.....	.....	131	32,462.73
Florida	376	21,280.93	115	12,430.60	.....	.....	.....	.....	491	33,711.53
Alabama	75	4,832.42	49	5,824.37	.....	.....	8	326.25	132	10,983.04
Mississippi	142	5,091.96	42	3,719.28	.....	.....	.....	.....	184	8,811.24
Louisiana	396	12,767.59	182	53,308.25	.....	.....	.....	.....	578	66,075.84
Texas	212	5,734.19	39	5,889.91	.....	.....	7	1,033.07	258	12,657.17
Tennessee	.....	.....	104	20,528.75	.....	.....	.....	.....	104	20,528.75
Kentucky	.....	.....	80	18,493.97	.....	.....	.....	.....	80	18,493.97
Missouri	.....	.....	146	51,585.99	.....	.....	124	111,765.45	270	163,351.44
Nebraska	.....	.....	22	3,636.56	.....	.....	.....	.....	22	3,636.56
Iowa	.....	.....	69	9,473.73	.....	.....	4	341.91	73	9,815.64
Minnesota	1	88.03	66	7,055.82	.....	.....	14	1,688.64	81	8,832.49
Wisconsin	242	50,528.95	151	31,906.62	.....	.....	.....	.....	393	82,435.57
Michigan	505	104,351.97	525	116,848.94	.....	.....	46	12,920.52	1,076	234,121.43
Illinois	136	15,719.45	239	53,553.58	.....	.....	1	35.00	376	69,308.03
Indiana	.....	.....	55	8,198.62	.....	.....	.....	.....	55	8,198.62
Ohio	176	70,210.68	257	102,416.24	.....	.....	6	2,342.18	439	174,969.10
West Virginia	.....	.....	101	10,475.45	.....	.....	.....	.....	101	10,475.45
California	687	144,540.95	198	103,591.98	.....	.....	.....	.....	885	248,132.93
Oregon	51	8,316.37	132	42,517.08	.....	.....	8	5,972.98	191	56,806.43
Washington	91	31,909.13	86	10,211.24	.....	.....	.....	.....	177	42,120.37
Alaska	16	259.69	4	365.29	.....	.....	.....	.....	20	624.98
Total	16,018	2,210,208.21	5,467	1,522,983.90	1,035	98,742.82	1,014	299,205.90	23,534	4,131,135.83

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No. 12.—*Number and Tonnage of* **SAILING VESSELS, STEAM VESSELS, CANAL-BOATS, *and* BARGES,** *&c.*—Continued.

SUMMARY.

STATES AND TERRITORIES IN WHICH DOCUMENTED.	SAILING VESSELS.		STEAM VESSELS.		CANAL-BOATS.		BARGES.		TOTAL.	
	No.	Tons.	No.	Tons.	No.	Tons.	No.	Tons.	No.	Tons.
Atlantic and Gulf Coasts	13,987	1,742,765.98	2,662	763,301.75	248	26,541.02	763	153,379.81	17,608	2,685,988.56
Pacific Coast	845	185,026.14	420	156,685.59	..	.....	8	5,972.98	1,273	347,684.71
Northern Lakes	1,235	282,319.16	1,280	381,907.80	789	72,201.80	101	26,131.81	3,405	762,560.57
Western Rivers	1	91.98	1,105	221,088.76	.....	.....	142	113,721.30	1,248	334,901.99
Grand total	16,018	2,210,203.21	5,467	1,522,983.90	1,085	98,742.82	1,014	299,205.90	23,534	4,131,135.83

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No. 18.—*Statement showing the Number and Tonnage of* **VESSELS** *of the United States engaged in the* **COD** *and* **MACKEREL FISHERIES**, *June 30,* **1886.**

STATES AND CUSTOMS DISTRICTS IN WHICH DOCUMENTED.	VESSELS OVER 20 TONS.		VESSELS UNDER 20 TONS.		TOTAL.	
	No.	Tons.	No.	Tons.	No.	Tons.
MAINE.						
Passamaquoddy	12	628.06	16	215.72	28	843.78
Machias	2	44.52	21	281.64	23	326.16
Frenchman's Bay	26	1,885.88	26	278.22	52	2,159.10
Castine	36	2,513.22	18	252.90	54	2,766.12
Bangor	.....	.....	4	64.55	4	64.55
Belfast	31	1,454.21	29	308.90	60	1,763.11
Waldoborough	50	1,073.92	64	780.98	114	1,854.90
Wiscasset	33	1,991.76	32	351.47	65	2,343.23
Bath	2	144.52	7	65.94	9	210.46
Portland and Falmouth	98	6,346.12	37	528.06	135	6,874.18
Saco	1	52.51	6	51.19	7	103.70
Kennebunk	20	1,346.38	9	93.48	29	1,439.86
York	.....	.....	3	36.08	3	36.08
Total	311	17,481.10	272	3,304.08	583	20,785.18
NEW HAMPSHIRE.						
Portsmouth	13	540.19	5	74.56	18	614.75
MASSACHUSETTS.						
Newburyport	8	280.47	10	104.47	18	384.94
Gloucester	384	27,838.74	53	631.48	437	28,470.22
Salem and Beverly	9	548.17	12	150.27	21	698.44
Marblehead	17	837.64	12	126.23	29	963.87
Boston and Charlestown	50	3,283.78	13	145.42	63	3,428.20
Plymouth	5	350.86	10	97.33	15	448.19
Barnstable	170	13,739.88	43	500.13	213	14,240.01
Edgartown	.....	.....	5	84.54	5	84.54
New Bedford	8	408.90	27	279.67	35	688.57
Fall River	.....	.....	4	45.94	4	45.94
Total	651	47,287.44	189	2,115.48	840	49,402.92
RHODE ISLAND.						
Providence	.....	.....	14	126.26	14	126.26
Bristol and Warren	.....	.....	4	39.48	4	39.48
Newport	15	1,470.20	27	310.12	42	1,780.32
Total	15	1,470.20	45	475.86	60	1,946.06
CONNECTICUT.						
Stonington	23	1,090.08	33	328.56	56	1,418.64
New London	32	1,424.35	24	353.01	56	1,777.36
Total	55	2,514.93	57	681.57	112	3,196.50
NEW YORK.						
New York	19	736.80	44	276.60	63	1,013.40
Sag Harbor	20	3,008.15	20	181.33	40	3,189.48
Total	39	3,744.95	64	457.93	103	4,202.88
NEW JERSEY.						
Great Egg Harbor	.....	.....	1	17.28	1	17.28
VIRGINIA.						
Cherrystone	1	22.26	.....	.....	1	22.26
NORTH CAROLINA.						
Beaufort	1	33.22	.....	.....	1	33.22

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No. 13.—*Statement showing the Number and Tonnage of* **VESSELS** *of the United States engaged in the* **COD** *and* **MACKEREL FISHERIES,** *June 30,* **1886**—Continued.

STATES AND CUSTOMS DISTRICTS IN WHICH DOCUMENTED.	VESSELS OVER 20 TONS.		VESSELS UNDER 20 TONS.		TOTAL.	
	No.	Tons.	No.	Tons.	No.	Tons.
FLORIDA.						
Pensacola	10	351.05	3	40.05	13	391.10
CALIFORNIA.						
San Diego	.....	.....	3	29.14	3	29.14
Wilmington	.....	.....	1	19.81	1	19.81
San Francisco	.....	.....	2	13.01	2	13.01
Total	.....	.....	6	61.96	6	61.96
OREGON.						
Willamette	.....	.....	1	30.70	1	30.70
Grand total	1,096	73,445.34	643	7,259.47	1,739	80,704.81

SUMMARY.

Maine	311	17,481.10	272	3,304.08	583	20,785.18
New Hampshire	13	540.19	5	74.56	18	614.75
Massachusetts	651	47,287.44	189	2,115.48	840	49,402.92
Rhode Island	15	1,470.20	45	475.86	60	1,946.06
Connecticut	55	2,514.93	57	681.57	112	3,196.50
New York	39	3,744.95	64	457.93	103	4,202.88
New Jersey	.....	.....	1	17.28	1	17.28
Virginia	1	22.26	.....	.....	1	22.26
North Carolina	1	33.22	.....	.....	1	33.22
Florida	10	351.05	3	40.05	13	391.10
California	.....	.....	6	61.96	6	61.96
Oregon	.....	.....	1	30.70	1	30.70
Grand total	1,096	73,445.34	643	7,259.47	1,739	80,704.81

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No. 14.—*Statement showing the Number and Tonnage of* **VESSELS** *of the United States engaged in the* **WHALE FISHERIES,** *June* 30, **1886.**

PORTS.	No.	Tons.
Boston, Mass	3	286.26
Barnstable, Mass	12	1,107.69
Edgartown, Mass	2	408.50
New Bedford, Mass. (sail)	80	19,939.72
New Bedford, Mass. (steam)	2	790.27
New London, Conn	5	605.92
Total	104	23,138.36

No. 15.—*Statement showing the* **EMPLOYMENT** *of the* **REGISTERED, ENROLLED,** *and* **LICENSED TONNAGE** *of the United States, June* 30, **1886.**

	Tons.		
Aggregate tonnage of the United States, June 30, 1886			4,131,135.88
Registered tonnage—			
Permanently	816,233.64		
Temporarily	294,945.49		
In the foreign trade	1,088,040.77		
In the whale fisheries	23,138.36		
		1,111,179.13	
Enrolled tonnage—			
Permanently	2,774,876.90		
Temporarily	163,885.52		
In the coasting trade	2,865,317.08		
In the cod and mackerel fisheries	73,445.34		
		2,938,762.42	
Licensed tonnage under 20 tons—			
In the coasting trade	73,934.81		
In the cod and mackerel fisheries	7,259.47		
		81,194.28	
			4,131,135.83
Steam navigation—			
Registered tonnage	176,638.17		
Enrolled and licensed tonnage	1,346,350.73		
		1,522,988.90	
Other than steam navigation—			
Registered tonnage	934,545.96		
Enrolled and licensed tonnage	1,673,605.97		
		2,608,151.93	
			4,131,135.83

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No. 16.—*Statement showing the Distribution of the Tonnage of the United States* **MERCHANT MARINE** *employed in the* **FOREIGN TRADE,** *the* **COASTING TRADE,** *and the* **FISHERIES,** *from* **1789** *to* **1886.**

YEAR ENDING—	FOREIGN TRADE.	COASTING TRADE.			WHALE FISHERIES.			*COD FISHERIES.			MACKEREL FISHERIES.	TOTAL MERCHANT MARINE.
	Registered vessels.	Enrolled vessels.	Licensed vessels under 20 tons.	Total.	Registered vessels.	Enrolled vessels.	Total.	Enrolled vessels.	Licensed vessels under 20 tons.	Total.	Enrolled vessels.	
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	
Dec. 31, 1789	123, 893	68, 607	.....	68, 607	.....	.....	.....	9, 062	.....	9, 062	.....	201, 562
1790	346, 254	103, 775	.....	103, 775	.....	.....	.....	28, 348	.....	28, 348	.....	478, 377
1791	363, 110	106, 494	.....	106, 494	.....	.....	.....	32, 542	.....	32, 542	.....	502, 146
1792	411, 438	120, 957	.....	120, 957	.....	.....	.....	32, 062	.....	32, 062	.....	564, 457
1793	367, 784	114, 853	7, 218	122, 071	.....	.....	.....	28, 974	1, 985	30, 959	.....	520, 764
1794	438, 868	145, 691	16, 977	162, 578	.....	4, 129	4, 129	17, 498	5, 550	23, 048	.....	628, 618
1795	529, 471	164, 796	19, 602	184, 398	.....	3, 163	3, 163	24, 887	6, 046	30, 933	.....	747, 965
1796	576, 733	195, 424	22, 417	217, 841	.....	2, 364	2, 364	28, 509	6, 453	34, 962	.....	831, 900
1797	597, 777	214, 077	23, 326	237, 403	.....	1, 104	1, 104	33, 406	7, 222	40, 628	.....	876, 912
1798	603, 376	227, 344	24, 099	251, 443	.....	763	763	35, 477	7, 269	42, 746	.....	898, 328
1799	657, 142	220, 904	25, 736	246, 640	5, 055	592	5, 647	23, 933	6, 046	29, 979	.....	939, 408
1800	667, 107	245, 295	27, 197	272, 492	2, 814	652	3, 466	22, 307	7, 120	29, 427	.....	972, 492
1801	630, 558	246, 255	28, 296	274, 551	2, 349	736	3, 085	31, 280	8, 102	39, 382	.....	947, 576
1802	557, 760	260, 543	29, 080	289, 623	2, 621	580	3, 201	32, 988	8, 534	41, 522	.....	892, 106
1803	585, 910	268, 676	30, 384	299, 060	11, 247	1, 143	12, 390	43, 416	8, 396	51, 812	.....	949, 172
1804	660, 514	286, 840	30, 697	317, 537	12, 016	323	12, 339	43, 088	8, 926	52, 014	.....	1, 042, 404
1805	744, 224	301, 366	31, 297	332, 663	5, 117	898	6, 015	48, 479	8, 986	57, 465	.....	1, 140, 367
1806	798, 507	309, 977	30, 563	340, 540	9, 778	729	10, 507	50, 353	8, 830	59, 183	.....	1, 208, 737
1807	840, 163	318, 190	30, 838	349, 028	8, 144	907	9, 051	60, 690	9, 616	70, 306	.....	1, 268, 548
1808	765, 252	387, 684	33, 135	420, 819	3, 802	724	4, 526	43, 598	8, 400	51, 998	.....	1, 242, 595
1809	906, 855	371, 501	33, 662	405, 163	3, 204	573	3, 777	26, 110	8, 377	34, 487	.....	1, 350, 282
1810	981, 019	371, 114	34, 233	405, 347	3, 250	339	3, 589	26, 251	8, 577	34, 828	.....	1, 424, 783
1811	763, 607	386, 259	34, 103	420, 362	5, 245	54	5, 299	34, 361	8, 873	43, 234	.....	1, 232, 502
1812	758, 686	443, 181	34, 791	477, 972	1, 988	942	2, 930	21, 822	8, 647	30, 459	.....	1, 269, 997
1813	672, 700	433, 405	37, 704	471, 109	2, 153	789	2, 942	11, 256	8, 622	19, 877	.....	1, 166, 628
1814	674, 633	425, 714	40, 445	466, 159	.....	562	562	8, 863	8, 992	17, 855	.....	1, 159, 209
1815	854, 295	435, 067	40, 599	475, 666	.....	1, 280	1, 280	26, 510	10, 427	36, 937	.....	1, 368, 128
1816	900, 760	479, 979	42, 186	522, 165	.....	1, 168	1, 168	37, 879	10, 247	48, 126	.....	1, 372, 219
1817	804, 851	481, 458	43, 572	525, 030	4, 874	350	5, 224	53, 990	10, 817	64, 807	.....	1, 399, 912
1818	899, 954	503, 140	46, 234	549, 374	16, 135	615	16, 750	58, 552	10, 555	69, 107	.....	1, 225, 185

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1819	561,230	523,556	47,502	971,656	31,709	666	52,386	65,045	11,662	76,078	.....	1,260,732
1820	583,657	539,080	48,945	588,025	35,391	1,054	36,445	60,843	11,197	72,040	.....	1,280,167
1821	593,825	559,436	55,409	614,845	26,071	1,924	27,995	51,352	10,941	62,293	.....	1,298,958
1822	582,701	573,080	51,109	624,189	45,449	8,134	48,583	58,405	10,821	69,226	.....	1,324,699
1823	600,003	566,409	51,396	617,805	39,918	585	40,503	67,041	11,214	78,255	.....	1,336,566
1824	636,807	589,223	52,340	641,563	33,166	180	33,346	68,239	9,208	77,447	.....	1,389,163
1825	665,409	587,273	53,588	640,861	35,379	.....	35,379	70,626	10,836	81,462	.....	1,423,111
1826	696,221	666,420	55,910	722,330	41,757	227	41,984	63,535	10,121	73,656	.....	1,534,191
1827	701,517	732,938	56,221	789,159	45,653	339	45,992	73,709	10,280	83,939	.....	1,620,607
1828	757,998	787,226	55,680	842,906	54,621	180	54,801	74,765	10,922	85,687	.....	1,741,392
1829	592,859	490,468	18,390	508,858	57,284	.....	57,284	97,889	3,908	101,797	.....	1,260,798
1830	537,563	496,640	20,839	516,979	38,912	793	39,705	58,041	3,515	61,556	35,978	1,191,776
1831	588,186	516,086	23,638	539,724	82,316	481	82,797	57,239	3,739	60,978	46,211	1,267,846
1832	614,121	624,159	25,468	649,627	72,869	377	73,246	51,725	3,303	55,028	47,428	1,439,450
1833	648,869	717,423	26,776	744,199	101,158	478	101,636	58,569	4,152	62,721	48,726	1,606,151
1834	749,378	755,463	28,156	783,619	108,060	364	108,424	52,473	3,931	56,404	61,082	1,758,907
Sept. 30, 1835 (nine months)	788,178	769,795	27,543	797,338	97,649	.....	97,649	72,374	4,964	77,338	64,443	1,824,941
1836	753,094	846,116	26,907	873,023	144,681	1,573	146,254	58,414	4,893	63,307	46,424	1,882,102
1837	683,205	927,250	29,731	956,981	127,242	1,895	129,137	75,055	5,497	80,552	46,811	1,896,686
1838	702,962	1,008,146	32,959	1,041,105	119,630	5,230	124,860	63,974	6,090	70,084	56,649	1,995,640
1839	702,400	1,120,311	33,241	1,153,552	131,845	440	132,285	65,167	7,091	72,258	35,984	2,096,479
1840	762,838	1,144,664	32,030	1,176,694	136,927	.....	136,927	67,927	8,109	76,036	28,269	2,180,764
1841	788,398	1,076,036	31,032	1,107,068	157,405	.....	157,405	60,556	5,996	66,552	11,321	2,180,744
1842	823,746	1,018,253	27,500	1,045,753	151,613	377	151,990	49,942	4,863	54,805	16,097	2,092,391
June 30, 1843 (nine months)	856,930	1,048,209	27,947	1,076,156	152,375	142	152,517	54,901	6,323	61,224	11,776	2,158,603
1844	900,471	1,078,868	30,747	1,109,615	168,294	320	168,614	78,179	7,046	85,225	16,171	2,280,096
1845	904,476	1,190,898	32,320	1,223,218	190,696	207	190,903	69,826	7,165	76,991	21,414	2,417,002
1846	943,307	1,289,871	25,706	1,315,577	186,980	440	187,420	72,516	6,802	79,318	36,463	2,562,085
1847	1,047,454	1,452,623	35,978	1,488,601	193,859	.....	193,859	70,178	7,503	77,681	31,451	2,839,046
1848	1,168,707	1,620,988	38,329	1,659,317	192,180	433	192,613	82,652	7,195	89,847	43,558	3,154,042
1849	1,258,756	1,731,411	38,965	1,770,376	180,186	.....	180,186	73,882	7,874	81,756	42,942	3,334,016
1850	1,439,694	1,755,797	42,028	1,797,825	146,017	.....	146,017	85,646	8,160	93,806	58,112	3,535,454
1851	1,544,663	1,854,318	45,658	1,899,976	181,644	.....	181,644	87,476	8,141	95,617	50,539	3,772,439
1852	1,705,650	2,008,022	47,851	2,055,873	193,798	.....	193,798	102,659	7,914	110,573	72,546	4,138,440
1853	1,910,471	2,082,782	51,476	2,134,258	193,203	.....	193,203	99,990	9,238	109,228	59,850	4,407,010
1854	2,151,918	2,373,900	48,214	2,422,114	181,901	.....	181,901	102,194	9,734	111,928	35,041	4,802,902
1855	2,348,358	2,491,108	52,147	2,543,255	186,778	70	186,848	102,928	8,987	111,915	21,625	5,212,001
1856	2,302,190	2,211,935	35,728	2,247,663	189,213	248	189,461	95,816	6,636	102,452	29,887	4,871,653
1857	2,263,196	2,300,399	36,210	2,336,609	195,772	70	195,842	104,573	7,295	111,868	28,328	4,940,843
1858	2,301,148	2,361,596	39,624	2,401,220	198,594	.....	198,594	110,896	8,356	119,252	29,594	5,049,808
1859	2,321,674	2,439,320	41,609	2,488,929	185,728	.....	185,728	120,577	9,060	129,637	27,070	5,145,038
1860	2,379,396	2,599,319	45,548	2,644,867	166,841	.....	166,841	127,508	9,145	136,653	26,111	5,353,868
1861	2,496,894	2,657,293	47,251	2,704,544	145,734	.....	145,734	127,311	10,535	137,846	54,795	5,539,813
1862	2,173,537	2,568,546	38,170	2,606,716	117,714	.....	117,714	122,863	10,738	133,601	80,596	5,112,164
1863	1,926,886	2,918,614	42,019	2,960,633	99,228	.....	99,228	106,560	10,730	117,290	51,019	5,155,056
1864	1,486,749	3,204,227	41,038	3,245,265	95,145	.....	95,145	92,745	10,997	103,742	55,499	4,986,400
1865	1,518,350	3,353,637	27,865	3,381,522	84,233	6,283	90,516	59,227	5,958	65,185	41,209	5,096,782
1866	1,387,756	2,689,152	30,469	2,719,621	105,170	.....	105,170	42,797	8,845	51,642	46,589	4,310,778
1867	1,515,648	2,627,151	33,239	2,660,390	52,384	.....	52,384	36,709	7,858	44,567	31,498	4,304,487
1868	1,494,389	2,658,404	43,736	2,702,140	71,343	.....	71,343	74,763	9,124	83,887	.....	4,351,759

* Mackerel fisheries included since 1867.

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No. 16.—*Statement showing the Distribution of the Tonnage of the United States* **MERCHANT MARINE** *employed in the* **FOREIGN TRADE,** *the* **COASTING TRADE,** *and the* **FISHERIES,** *from* **1789** *to* **1886**—Continued.

YEAR ENDING—	FOREIGN TRADE.	COASTING TRADE.			WHALE FISHERIES.			*COD FISHERIES.			MACKEREL FISHERIES.	TOTAL MERCHANT MARINE.
	Registered vessels.	Enrolled vessels.	Licensed vessels under 20 tons.	Total.	Registered vessels.	Enrolled vessels.	Total.	Enrolled vessels.	Licensed vessels under 20 tons.	Total.	Enrolled vessels.	
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	
June 30, 1869	1,496,220	2,470,928	44,587	2,515,515	70,202	.....	70,202	55,165	7,539	62,704	.....	4,144,641
1870	1,448,846	2,595,328	42,919	2,638,247	67,954	.....	67,954	82,612	8,848	91,460	.....	4,248,507
1871	1,363,652	2,722,372	42,228	2,764,600	61,490	.....	61,490	82,902	9,963	92,865	.....	4,282,607
1872	1,359,040	2,883,906	45,646	2,929,552	51,608	.....	51,608	87,403	10,144	97,547	.....	4,437,747
1873	1,378,533	3,116,373	46,847	3,163,220	44,755	.....	44,755	99,542	9,977	109,519	.....	4,696,027
1874	1,389,815	3,243,656	49,783	3,293,439	39,108	.....	39,108	68,490	9,800	78,290	.....	4,800,652
1875	1,515,598	3,169,687	50,011	3,219,698	38,229	.....	38,229	68,703	11,504	80,207	.....	4,853,732
1876	1,553,705	2,547,490	51,345	2,598,835	39,116	.....	39,116	77,314	10,488	87,802	.....	4,279,458
1877	1,570,600	2,488,189	52,133	2,540,322	40,593	.....	40,593	79,078	11,407	91,085	.....	4,242,600
1878	1,589,348	2,444,801	52,369	2,497,170	39,700	.....	39,700	71,560	11,987	86,547	.....	4,212,765
1879	1,451,505	2,545,059	53,123	2,598,183	40,028	.....	40,028	66,543	13,342	79,885	.....	4,169,601
1880	1,314,402	2,584,418	53,268	2,637,686	38,408	.....	38,408	64,935	12,608	77,538	.....	4,068,034
1881	1,297,035	2,590,835	55,175	2,646,011	38,551	.....	38,551	66,365	9,771	76,136	.....	4,057,734
1882	1,259,492	2,740,206	55,570	2,795,776	32,802	.....	32,802	67,015	10,818	77,863	.....	4,165,933
1883	1,269,681	2,774,248	64,106	2,838,354	32,414	.....	32,414	84,322	10,716	95,038	.....	4,235,487
1884	1,276,972	2,813,919	70,149	2,884,068	27,249	.....	27,249	72,609	10,331	82,940	.....	4,271,229
1885	1,262,814	2,822,598	72,773	2,895,371	25,184	.....	25,184	73,975	8,590	82,565	.....	4,265,934
1886	1,088,041	2,865,317	73,935	2,939,252	23,138	.....	23,138	72,445	7,260	80,705	.....	4,131,136

* Mackerel fisheries included since 1867.

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No. 17.—*Statement showing Class, Number, and Tonnage of the* **VESSELS BUILT** *in* EACH CUSTOMS DISTRICT *of the United States during the* **Year** *ending June* 30, **1886.**

STATES AND CUSTOMS DISTRICTS IN WHICH BUILT.	SAILING VESSELS.			STEAM VESSELS.			CANAL-BOATS.			BARGES.			TOTAL.		
	No.	Tons.		No.	Tons.		No.	Tons.		No.	Tons.		No.	Tons.	
		Gross.	Net.		Gross.	Net.		Gross.	Net.		Gross.	Net.		Gross.	Net.
THE ATLANTIC AND GULF COASTS.															
MAINE.															
Passamaquoddy	5	49.98	47.47										5	49.98	47.47
Machias	2	936.49	899.67										2	936.49	899.67
Frenchman's Bay	2	102.52	97.44										2	102.52	97.44
Castine	2	76.96	73.12										2	76.96	73.12
Bangor	3	327.11	310.76	2	110.09	73.54							5	437.20	384.30
Belfast	3	2,817.26	2,676.35										3	2,817.26	2,676.35
Waldoborough	7	3,607.97	3,425.68										7	3,607.97	3,425.68
Wiscasset	3	262.45	249.33	2	225.52	116.60							5	487.97	365.93
Bath	20	14,070.30	13,389.36	2	315.09	157.55				1	214.70	214.70	23	14,600.09	13,761.61
Kennebunk				1	291.50	197.46							1	291.50	197.46
Total	47	22,251.04	21,169.18	7	942.20	545.15				1	214.70	214.70	55	23,407.94	21,929.03
MASSACHUSETTS.															
Newburyport	1	12.87	12.23										1	12.87	12.23
Gloucester	17	1,365.52	1,297.46	1	22.05	12.07							18	1,387.57	1,309.53
Marblehead	2	12.82	12.18										2	12.82	12.18
Boston and Charlestown	1	85.68	81.40	4	208.21	106.89							5	293.89	188.29
Barnstable	2	12.94	12.30										2	12.94	12.30
New Bedford	1	6.15	5.84										1	6.15	5.84
Fall River				1	16.26	12.38							1	16.26	12.38
Total	24	1,495.98	1,421.41	6	246.52	131.34							30	1,742.50	1,552.75
RHODE ISLAND.															
Providence	2	12.40	11.77										2	12.40	11.77
Bristol and Warren				1	51.88	27.95							1	51.88	27.95
Newport	1	13.10	12.45										1	13.10	12.45
Total	3	25.50	24.22	1	51.88	27.95							4	77.38	52.17

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No. 17.—*Statement showing Class, Number, and Tonnage of the* **VESSELS BUILT** *in* EACH CUSTOMS DISTRICT *of the United States during the* **Year** *ending June* 30, **1886**—Continued.

STATES AND CUSTOMS DISTRICTS IN WHICH BUILT.	SAILING VESSELS.			STEAM VESSELS.			CANAL-BOATS.			BARGES.			TOTAL.		
	No.	Tons.		No.	Tons.		No.	Tons.		No.	Tons.		No.	Tons.	
		Gross.	Net.		Gross.	Net.		Gross.	Net.		Gross.	Net.		Gross.	Net.
THE ATLANTIC AND GULF COASTS—Continued.															
CONNECTICUT.															
Stonington	4	69.06	65.62	1	2,554.65	1,800.97	....	.....	.....	....	.....	.....	5	2,623.71	1,866.59
New London	2	241.67	229.59	....	.....	.....	....	.....	.....	....	.....	.....	2	241.67	229.59
Middletown	....	.....	.....	....	.....	.....	....	.....	.....	1	148.48	141.06	1	148.48	141.06
New Haven	4	1,828.33	1,736.83	3	207.84	116.94	....	.....	.....	....	.....	.....	7	2,036.17	1,853.77
Fairfield	2	16.38	15.57	5	329.82	186.88	....	.....	.....	....	.....	.....	7	346.20	202.45
Total	12	2,155.44	2,047.61	9	3,092.31	2,104.79	....	.....	.....	1	148.48	141.06	22	5,396.23	4,293.46
NEW YORK.															
New York	27	718.23	682.52	29	3,176.34	2,109.83	5	870.84	542.32	14	2,440.02	2,358.83	75	7,205.43	5,693.50
Sag Harbor	1	22.40	21.28	....	.....	.....	....	.....	.....	....	.....	.....	1	22.40	21.28
Total	28	740.63	703.80	29	3,176.34	2,109.83	5	870.84	542.32	14	2,440.02	2,358.83	76	7,227.83	5,714.78
NEW JERSEY.															
Newark	....	.....	.....	1	175.61	160.45	....	.....	.....	....	.....	.....	1	175.61	160.45
Perth Amboy	3	27.60	26.24	....	.....	.....	....	.....	.....	15	1,761.58	1,673.58	18	1,789.18	1,699.82
Great Egg Harbor	2	451.08	428.52	....	.....	.....	....	.....	.....	....	.....	.....	2	451.08	428.52
Bridgeton	20	349.77	332.26	....	.....	.....	....	.....	.....	....	.....	.....	20	349.77	332.26
Burlington	1	9.76	8.65	1	89.30	85.33	....	.....	.....	....	.....	.....	2	99.06	93.98
Total	26	838.21	795.67	2	264.91	245.78	....	.....	.....	15	1,761.58	1,673.58	43	2,864.70	2,715.03
PENNSYLVANIA.															
Philadelphia	6	1,861.60	1,768.53	19	6,117.71	4,208.61	....	.....	.....	2	454.95	440.41	27	8,434.26	6,417.55
DELAWARE.															
Delaware	2	82.10	78.00	5	2,149.70	1,518.28	....	.....	.....	....	.....	.....	7	2,231.80	1,596.28

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MARYLAND.																
Baltimore	55	1,104.91	1,049.69	4	2,064.81	1,549.86	....	.....	.....	....	.....	.....	59	3,169.72	2,599.65
Annapolis	2	22.30	20.59	....	.....	.....	....	.....	.....	....	.....	.....	2	22.30	20.59
Eastern Maryland	47	559.78	531.88	....	.....	.....	....	.....	.....	....	.....	.....	47	559.78	531.88
Total	104	1,686.99	1,602.16	4	2,064.81	1,549.86	....	.....	.....	....	.....	.....	108	3,751.80	3,152.12
DISTRICT OF COLUMBIA.																
Georgetown	1	58.60	55.67	....	.....	.....	....	.....	.....	....	.....	.....	1	58.60	55.67
VIRGINIA.																
Alexandria	4	616.03	585.23	....	.....	.....	....	.....	.....	....	.....	.....	4	616.03	585.23
Tappahannock	2	24.61	23.38	....	.....	.....	....	.....	.....	....	.....	.....	2	24.61	23.38
Petersburg	1	12.86	12.22	....	.....	.....	....	.....	.....	....	.....	.....	1	12.86	12.22
Yorktown	3	22.90	21.76	....	.....	.....	....	.....	.....	....	.....	.....	3	22.90	21.76
Norfolk and Portsmouth	10	93.84	89.24	2	40.34	23.99	....	.....	.....	....	.....	.....	12	134.18	113.23
Cherrystone	4	24.93	23.68	....	.....	.....	....	.....	.....	....	.....	.....	4	24.93	23.68
Total	24	795.17	755.51	2	40.34	23.99	....	.....	.....	....	.....	.....	26	835.51	779.50
NORTH CAROLINA.																
Albemarle	3	27.87	26.49	1	16.81	8.66	....	.....	.....	....	.....	.....	4	44.68	35.15
Pamlico	2	15.86	15.07	1	128.49	82.93	....	.....	.....	....	.....	.....	3	144.35	98.00
Beaufort	2	33.13	31.47	....	.....	.....	....	.....	.....	....	.....	.....	2	33.13	31.47
Wilmington	.....	.....	.....	2	189.32	105.60	....	.....	.....	....	.....	.....	2	189.32	105.60
Total	7	76.86	73.03	4	334.62	197.19	....	.....	.....	....	.....	.....	11	411.48	270.22
SOUTH CAROLINA.																
Charleston	6	91.04	86.53	....	.....	.....	....	.....	.....	....	.....	.....	6	91.04	86.53
GEORGIA.																
Savannah	4	51.88	50.37	....	.....	.....	....	.....	.....	....	.....	.....	4	51.88	50.37
FLORIDA.																
Saint John's	2	49.74	47.25	4	126.18	98.85	....	.....	.....	....	.....	.....	6	175.92	146.10
Key West	7	128.09	121.69	1	33.35	16.68	....	.....	.....	....	.....	.....	8	161.44	138.37
Saint Mark's	7	65.15	61.89	2	34.76	31.86	....	.....	.....	....	.....	.....	9	99.91	93.75
Apalachicola	2	12.30	11.69	1	109.73	109.73	....	.....	.....	....	.....	.....	3	122.03	121.42
Pensacola	3	23.54	22.36	....	.....	.....	....	.....	.....	....	.....	.....	3	23.54	22.36
Total	21	278.82	264.88	8	304.02	257.12	....	.....	.....	....	.....	.....	29	582.84	532.00
ALABAMA.																
Mobile	5	99.77	94.79	3	275.67	275.67	....	.....	.....	....	.....	.....	8	375.44	370.46

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No. 17.—*Statement showing Class, Number, and Tonnage of the* **VESSELS BUILT** *in* EACH CUSTOMS DISTRICT *of the United States during the* **Year** *ending June* 30, **1886**—Continued.

STATES AND CUSTOMS DISTRICTS IN WHICH BUILT.	SAILING VESSELS.			STEAM VESSELS.			CANAL-BOATS.			BARGES.			TOTAL.		
	No.	Tons.		No.	Tons.		No.	Tons.		No.	Tons.		No.	Tons.	
		Gross.	Net.		Gross.	Net.		Gross.	Net.		Gross.	Net.		Gross.	Net.
THE ATLANTIC AND GULF COASTS—Continued.															
MISSISSIPPI.															
Pearl River	13	242.95	230.86										13	242.95	230.86
LOUISIANA.															
New Orleans	8	93.85	89.15										8	93.85	89.15
Teche	5	45.78	43.77	1	35.35	29.35				3	443.11	443.11	9	524.24	516.23
Total	13	139.63	132.92	1	35.35	29.35				3	443.11	443.11	17	618.09	605.38
TEXAS.															
Galveston	8	135.62	129.86										8	135.62	129.86
Saluria	1	6.11	5.80										1	6.11	5.80
Total	9	141.73	135.66										9	141.73	135.66
Total Atlantic and Gulf Coasts	355	33,113.94	31,490.80	100	10,096.38	13,225.01	5	870.84	542.32	36	5,462.84	5,271.69	496	58,544.00	50,529.82
THE PACIFIC COAST.															
CALIFORNIA.															
San Diego	2	26.12	24.82										2	26.12	24.82
San Francisco	17	673.60	828.50	8	1,981.54	1,472.39							25	2,855.14	2,300.89
Humboldt	1	145.26	138.00	1	57.70	39.00							2	202.96	177.00
Total	20	1,044.98	991.32	9	2,039.24	1,511.39							29	3,084.22	2,502.71
OREGON.															
Southern Oregon	2	610.16	601.26										2	610.16	601.26
Oregon	4	103.38	98.51	1	83.02	16.51							5	186.40	115.02

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Willamette	1	13.09	8.94	8	591.84	495.85	....	.....	.....	....	.....	.....	9	604.93	504.79
Total	7	726.63	708.71	9	624.86	512.36	....	.....	.....	....	.....	.....	16	1,351.49	1,221.07
WASHINGTON.															
Puget Sound	8	1,119.00	1,055.49	5	359.21	210.80	....	.....	.....	....	.....	.....	13	1,478.21	1,265.29
Total Pacific Coast	35	2,890.61	2,755.52	23	3,023.31	2,234.55	....	.....	.....	....	.....	.....	58	5,913.92	4,990.07
THE NORTHERN LAKES.															
VERMONT.															
Vermont	....	.....	.....	1	37.70	18.85	....	.....	.....	....	.....	.....	1	37.70	18.85
NEW YORK.															
Champlain	....	.....	.....	.....	.....	.....	11	1,155.25	1,093.56	....	.....	.....	11	1,155.25	1,093.56
Oswegatchie	....	.....	.....	2	50.07	29.83	..	.....	.....	1	98.37	98.37	3	148.44	128.20
Cape Vincent	1	33.93	32.24	1	6.61	4.20	..	.....	.....	....	.....	.....	2	40.54	36.44
Oswego	....	.....	.....	1	13.51	6.75	3	401.95	381.86	....	.....	.....	4	415.46	388.61
Genesee	1	8.70	8.27	1	14.46	7.23	2	281.30	267.24	....	.....	.....	4	304.46	282.74
Niagara	....	.....	.....	.....	.....	.....	2	269.49	212.19	....	.....	.....	2	269.49	212.19
Buffalo Creek	....	.....	.....	7	355.16	215.03	..	.....	.....	3	230.06	230.06	10	585.22	445.09
Total	2	42.63	40.51	12	439.81	263.04	18	2,107.99	1,959.85	4	328.43	328.43	36	2,918.86	2,591.83
PENNSYLVANIA.															
Erie	....	.....	.....	1	13.78	6.89	....	.....	.....	....	.....	.....	1	13.78	6.89
OHIO.															
Cuyahoga	....	.....	.....	5	5,666.21	4,737.48	....	.....	.....	....	.....	.....	5	5,666.21	4,737.48
Sandusky	....	.....	.....	5	219.64	152.27	....	.....	.....	....	.....	.....	5	219.64	152.27
Total	....	.....	.....	10	5,885.85	4,889.75	....	.....	.....	....	.....	.....	10	5,885.85	4,889.75
MICHIGAN.															
Detroit	1	991.34	956.57	1	1,923.95	1,324.49	....	.....	.....	1	83.35	83.35	3	2,998.64	2,364.41
Huron	4	3,650.25	3,467.76	5	3,000.57	2,197.51	..	.....	.....	....	.....	.....	9	6,650.82	5,665.27
Superior	1	290.97	277.25	1	17.38	11.02	..	.....	.....	....	.....	.....	2	308.35	288.27
Michigan	6	245.53	233.64	7	216.59	122.18	..	.....	.....	....	.....	.....	13	462.12	355.82
Total	12	5,178.09	4,935.22	14	5,158.49	3,655.20	....	.....	.....	1	83.35	83.35	27	10,419.93	8,673.77
ILLINOIS.															
Chicago	....	.....	.....	3	89.37	44.69	....	.....	.....	....	.....	.....	3	89.37	44.69
WISCONSIN.															
Milwaukee	....	.....	.....	6	1,023.43	757.62	....	.....	.....	....	.....	.....	6	1,023.43	757.62

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No. 17.—*Statement showing Class, Number, and Tonnage of the* **VESSELS BUILT** *in* EACH CUSTOMS DISTRICT *of the United States during the* **Year** *ending June* 30, **1886**—Continued.

STATES AND CUSTOMS DISTRICTS IN WHICH BUILT.	SAILING VESSELS.			STEAM VESSELS.			CANAL-BOATS.			BARGES.			TOTAL.		
	No.	Tons.		No.	Tons.		No.	Tons.		No.	Tons.		No.	Tons.	
		Gross.	Net.		Gross.	Net.		Gross.	Net.		Gross.	Net.		Gross.	Net.
THE NORTHERN LAKES—Cont'd.															
MINNESOTA.															
Duluth	1	11.62	11.04										1	11.62	11.04
Total Northern Lakes	15	5,232.34	4,986.77	47	12,648.43	9,636.04	18	2,107.99	1,959.85	5	411.78	411.78	85	20,400.54	16,994.44
THE WESTERN RIVERS.															
LOUISIANA.															
New Orleans				2	95.87	66.34							2	95.87	66.34
MISSISSIPPI.															
Vicksburg				2	63.80	47.74							2	63.80	47.74
TENNESSEE.															
Memphis				8	818.27	809.59							8	818.27	809.59
Nashville				2	131.67	70.77							2	131.67	70.77
Chattanooga				2	505.91	294.65							2	505.91	294.65
Total				12	1,455.85	1,175.01							12	1,455.85	1,175.01
KENTUCKY.															
Paducah				2	305.20	157.75							2	305.20	157.75
Louisville				11	2,269.87	2,219.93							11	2,269.87	2,219.93
Total				13	2,575.07	2,377.68							13	2,575.07	2,377.68
MISSOURI.															
Saint Louis				2	86.68	85.12							2	86.68	85.12
Kansas City				1	25.81	25.81							1	25.81	25.81
Total				3	112.49	110.93							3	112.49	110.93

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NEBRASKA.															
Omaha				2	50.52	45.88							2	50.52	45.88
IOWA.															
Burlington				3	144.07	144.07				3	159.49	159.49	5	303.56	303.56
Dubuque				2	260.35	260.35							2	260.35	260.35
Total				4	404.42	404.42				3	159.49	159.49	7	563.91	563.91
MINNESOTA.															
Minnesota				3	235.20	229.20				1	73.86	73.86	4	309.06	303.06
WISCONSIN.															
La Crosse				4	142.57	142.57							4	142.57	142.57
ILLINOIS.															
Galena										1	35.00	35.00	1	35.00	35.00
INDIANA.															
Evansville				1	235.20	159.40							1	235.20	159.40
OHIO.															
Cincinnati				4	718.04	704.85				1	626.88	626.88	5	1,344.92	1,331.73
WEST VIRGINIA.															
Wheeling				8	724.25	675.98							8	724.25	675.98
PENNSYLVANIA.															
Pittsburgh				12	2,886.42	2,281.54							12	2,886.42	2,281.54
Total Western Rivers				70	9,699.70	8,421.49				6	895.23	895.23	76	10,594.93	9,316.72

SUMMARY.

Atlantic and Gulf Coasts	355	33,113.94	31,490.80	100	19,096.38	13,225.01	5	870.84	542.32	36	5,462.84	5,271.69	496	58,544.00	50,529.82
Pacific Coast	35	2,890.61	2,755.52	23	3,023.31	2,234.55							58	5,913.92	4,990.07
Northern Lakes	15	5,232.34	4,986.77	47	12,648.43	9,636.04	18	2,107.99	1,959.85	5	411.78	411.78	85	20,400.54	16,994.44
Western Rivers				70	9,699.70	8,421.49				6	895.23	895.23	76	10,594.93	9,316.72
Grand total	405	41,236.89	39,233.09	240	44,467.82	33,517.09	23	2,978.83	2,502.17	47	6,769.85	6,578.70	715	95,453.39	81,831.05

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No. 18.—*Consolidated Statement showing the Class, Number, and Tonnage of* **VESSELS BUILT** *in the United States during the* **Year** *ending June 30,* **1886.**

STATES AND TERRITORIES IN WHICH BUILT.	SAILING VESSELS.			STEAM VESSELS.			CANAL-BOATS.			BARGES.			TOTAL.		
	No.	Tons.		No.	Tons.		No.	Tons.		No.	Tons.		No.	Tons.	
		Gross.	Net.		Gross.	Net.		Gross.	Net.		Gross.	Net.		Gross.	Net.
THE ATLANTIC AND GULF COASTS.															
Maine	47	22,251.04	21,169.18	7	942.20	545.15	...	...	...	1	214.70	214.70	55	23,407.94	21,929.03
Massachusetts	24	1,495.98	1,421.41	6	246.52	131.34	...	...	...	...	...	...	30	1,742.50	1,552.75
Rhode Island	3	25.50	24.22	1	51.88	27.95	...	...	...	...	...	...	4	77.38	52.17
Connecticut	12	2,155.44	2,047.61	9	3,092.31	2,104.79	...	...	...	1	148.48	141.06	22	5,396.23	4,293.46
New York	28	740.63	703.80	29	3,176.34	2,109.83	5	870.84	542.32	14	2,440.02	2,358.83	76	7,227.83	5,714.78
New Jersey	26	838.21	795.67	2	264.91	245.78	...	...	...	15	1,761.58	1,673.58	43	2,864.70	2,715.03
Pennsylvania	6	1,861.60	1,768.53	19	6,117.71	4,208.61	...	...	...	2	454.95	440.41	27	8,434.26	6,417.55
Delaware	2	82.10	78.00	5	2,149.70	1,518.28	...	...	...	...	...	...	7	2,231.80	1,596.28
Maryland	104	1,686.99	1,602.16	4	2,064.81	1,549.96	...	...	...	...	...	...	108	3,751.80	3,152.12
District of Columbia	1	58.60	55.67	...	...	...	...	...	...	...	...	...	1	58.60	55.67
Virginia	24	795.17	755.51	2	40.34	23.99	...	...	...	...	...	...	26	835.51	779.50
North Carolina	7	76.86	73.03	4	334.62	197.19	...	...	...	...	...	...	11	411.48	270.22
South Carolina	6	91.04	86.53	...	...	...	...	...	...	...	...	...	6	91.04	86.53
Georgia	4	51.88	50.37	...	...	...	...	...	...	...	...	...	4	51.88	50.37
Florida	21	278.82	264.88	8	304.02	257.12	...	...	...	...	...	...	29	582.84	522.00
Alabama	5	99.77	94.79	3	275.67	275.67	...	...	...	...	...	...	8	375.44	370.46
Mississippi	13	242.95	230.86	...	...	...	...	...	...	...	...	...	13	242.95	230.86
Louisiana	13	139.63	132.92	1	35.35	29.35	...	...	...	3	443.11	443.11	17	618.09	605.38
Texas	9	141.73	135.66	...	...	...	...	...	...	...	...	...	9	141.73	135.66
Total Atlantic and Gulf Coasts	355	33,113.94	31,490.80	100	19,096.38	13,225.01	5	870.84	542.32	36	5,462.84	5,271.69	496	58,544.00	50,529.82
THE PACIFIC COAST.															
California	20	1,044.98	991.32	9	2,039.24	1,511.39	...	...	...	...	...	...	29	3,084.22	2,502.71
Oregon	7	726.63	708.71	9	624.86	512.36	...	...	...	...	...	...	16	1,351.49	1,221.07
Washington	8	1,119.00	1,055.49	5	359.21	210.80	...	...	...	...	...	...	13	1,478.21	1,265.29
Total Pacific Coast	35	2,890.61	2,755.52	23	3,023.31	2,234.55	...	...	...	...	...	...	58	5,913.92	4,990.07
THE NORTHERN LAKES.															
Vermont	...	...	...	1	37.70	18.85	...	...	...	...	...	...	1	37.70	18.85
New York	2	42.68	40.51	12	439.81	263.04	18	2,107.99	1,959.85	4	338.43	338.43	36	2,918.86	2,601.83

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Pennsylvania				1	13.78	6.89							1	13.78	6.89
Ohio				10	5,885.85	4,889.75							10	5,885.85	4,889.75
Michigan	12	5,178.09	4,995.22	14	5,158.49	3,655.20				1	83.35	83.35	27	10,419.93	8,673.77
Illinois				3	89.37	44.69							3	89.37	44.69
Wisconsin				6	1,023.43	757.62							6	1,023.43	757.62
Minnesota	1	11.62	11.04										1	11.62	11.04
Total Northern Lakes	15	5,232.34	4,986.77	47	12,648.43	9,636.04	18	2,107.99	1,959.85	5	411.78	411.78	85	20,400.54	16,994.44
THE WESTERN RIVERS.															
Louisiana				2	95.87	66.34							2	95.87	66.34
Mississippi				2	63.80	47.74							2	63.80	47.74
Tennessee				12	1,455.85	1,175.01							12	1,455.85	1,175.01
Kentucky				13	2,575.07	2,377.68							13	2,575.07	2,377.68
Missouri				3	112.49	110.93							3	112.49	110.93
Nebraska				2	50.52	45.83							2	50.52	45.83
Iowa				4	404.42	404.42				3	159.49	159.49	7	563.91	563.91
Minnesota				3	235.20	229.20				1	73.86	73.86	4	309.06	303.06
Wisconsin				4	142.57	142.57							4	142.57	142.57
Illinois										1	35.00	35.00	1	35.00	35.00
Indiana				1	235.20	159.40							1	235.20	159.40
Ohio				4	718.04	704.85				1	626.88	626.88	5	1,344.92	1,331.73
West Virginia				8	724.25	675.98							8	724.25	675.98
Pennsylvania				12	2,886.42	2,281.54							12	2,886.42	2,281.54
Total Western Rivers				70	9,699.70	8,421.49				6	895.23	895.23	76	10,594.93	9,316.72

SUMMARY.

Atlantic and Gulf Coasts	355	33,113.94	31,490.80	100	19,096.38	13,225.01	5	870.84	542.32	36	5,462.84	5,271.69	496	58,544.00	50,529.82
Pacific Coast	35	2,890.61	2,755.52	23	3,023.31	2,234.55							58	5,913.92	4,990.07
Northern Lakes	15	5,232.34	4,986.77	47	12,648.43	9,636.04	18	2,107.99	1,959.85	5	411.78	411.78	85	20,400.54	16,994.44
Western Rivers				70	9,699.70	8,421.49				6	895.23	895.23	76	10,594.93	9,316.72
Grand total	405	41,236.89	39,233.09	240	44,467.82	33,517.09	23	2,978.83	2,502.17	47	6,769.85	6,578.70	715	95,453.39	81,831.05

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No. 19.—*Statement showing the* **CLASS, NUMBER,** *and* **TONNAGE** *of* **SAILING VESSELS BUILT** *in each* **CUSTOMS DISTRICT** *of the* **UNITED STATES** *during the* **Year** *ending June 30,* **1886.**

STATES AND CUSTOMS DISTRICTS IN IN WHICH BUILT.	SHIPS.			BARKS AND BARKENTINES.			BRIGS.			SCHOONERS.			SLOOPS.			TOTAL.		
	No.	Tons.		No.	Tons.		No.	Tons.		No.	Tons.		No.	Tons.		No.	Tons.	
		Gross.	Net.		Gross.	Net.		Gross.	Net.		Gross.	Net.		Gross.	Net.		Gross.	Net.
THE ATLANTIC AND GULF COASTS.																		
MAINE.																		
Passamaquoddy				1	606.26	663.35				5	49.98	47.47				5	49.98	47.47
Machias										1	226.23	226.32				2	936.49	899.67
Frenchman's Bay										2	102.53	97.44				2	102.53	97.44
Castine										2	76.96	73.12				2	76.96	73.12
Bangor										3	327.11	310.76				3	327.11	310.76
Belfast	1	2,628.98	2,497.43							2	188.33	178.92				3	2,817.26	2,676.35
Waldoborough										6	3,598.04	3,416.25	1	9.93	9.43	7	3,607.97	3,425.68
Wiscasset										3	262.45	249.33				3	262.45	249.33
Bath	4	7,536.95	7,181.72	2	1,624.96	1,543.73				10	4,821.31	4,581.18	4	37.08	32.74	20	14,070.30	13,389.36
Total	5	10,165.88	9,679.15	3	2,323.22	2,207.07				34	9,664.98	9,190.79	5	97.01	92.17	47	22,251.04	21,169.18
MASSACHUSETTS.																		
Newburyport													1	12.87	12.23	1	12.87	12.23
Gloucester										15	1,344.24	1,277.25	2	21.28	20.21	17	1,365.52	1,297.46
Marblehead										1	5.28	5.02	1	7.54	7.16	2	12.82	12.18
Boston and Charlestown										1	85.68	81.40				1	85.68	81.40
Barnstable										1	5.84	5.55	1	7.10	6.75	2	12.94	12.30
New Bedford													1	6.15	5.84	1	6.15	5.84
Total										18	1,441.04	1,369.22	6	54.94	52.19	24	1,495.98	1,421.41
RHODE ISLAND.																		
Providence													2	12.40	11.77	2	12.40	11.77
Newport													1	13.10	12.45	1	13.10	12.45
Total													3	25.50	24.22	3	25.50	24.22

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CONNECTICUT.																				
Stonington											1	45.47	43.20	3	23.59	22.42	4	69.06	65.62
New London											1	233.33	221.67	1	8.34	7.92	2	241.67	229.59
New Haven											3	1,818.37	1,727.37	1	9.96	9.46	4	1,828.33	1,736.83
Fairfield														2	16.38	15.57	2	16.38	15.57
Total											5	2,097.17	1,992.24	7	58.27	55.37	12	2,155.44	2,047.61
NEW YORK.																				
New York											6	436.97	415.24	21	231.26	267.28	27	718.23	682.53
Sag Harbor														1	22.40	21.28	1	22.40	21.28
Total											6	436.97	415.24	22	303.66	288.56	28	740.63	703.80
NEW JERSEY.																				
Perth Amboy											1	8.94	8.50	2	18.66	17.74	3	27.60	26.24
Great Egg Harbor											2	451.08	428.52				2	451.08	428.52
Bridgeton											10	220.19	209.17	10	129.58	123.09	20	349.77	332.26
Burlington														1	9.76	8.65	1	9.76	8.65
Total											13	680.21	646.19	13	158.00	149.48	26	838.21	795.67
PENNSYLVANIA.																				
Philadelphia											4	1,807.32	1,716.96	2	54.28	51.57	6	1,861.60	1,768.53
DELAWARE.																				
Delaware											1	6.33	6.01	1	75.77	71.99	2	82.10	78.00
MARYLAND.																				
Baltimore											1	135.66	128.88	44	854.24	811.54	10	115.01	109.27	55	1,104.91	1,049.69
Annapolis														2	22.80	20.59				2	22.80	20.59
Eastern Maryland														39	479.45	455.55	8	80.33	76.33	47	559.78	531.88
Total											1	135.66	128.88	95	1,355.99	1,287.68	18	195.34	185.60	104	1,686.99	1,602.16
DISTRICT OF COLUMBIA.																				
Georgetown											1	58.60	55.67							1	58.60	55.67
VIRGINIA.																				
Alexandria											4	616.03	585.23							4	616.03	585.23
Tappahannock											1	12.59	11.96	1	12.02	11.42	2	24.61	23.38
Petersburg														1	12.86	12.22	1	12.86	12.22
Yorktown											2	16.34	15.53	1	6.56	6.23	3	22.90	21.76
Norfolk and Portsmouth											2	17.56	16.71	8	76.28	72.53	10	93.84	89.24

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No. 19.—*Statement showing the* **CLASS, NUMBER,** *and* **TONNAGE** *of* **SAILING VESSELS BUILT** *in each* **CUSTOMS DISTRICT** *of the* **UNITED STATES** *during the* **Year** *ending June* 30, **1886**—Continued.

STATES AND CUSTOMS DISTRICTS IN WHICH BUILT.	SHIPS.			BARKS AND BARKENTINES.			BRIGS.			SCHOONERS.			SLOOPS.			TOTAL.		
	No.	Tons.		No.	Tons.		No.	Tons.		No.	Tons.		No.	Tons.		No.	Tons.	
		Gross.	Net.		Gross.	Net.		Gross.	Net.		Gross.	Net.		Gross.	Net.		Gross.	Net.
THE ATLANTIC AND GULF COASTS—Continued.																		
VIRGINIA—continued.																		
Cherrystone													4	24.93	23.68	4	24.93	23.68
Total										9	662.52	629.43	15	132.65	120.08	24	795.17	755.51
NORTH CAROLINA.																		
Albemarle										2	19.52	18.55	1	8.35	7.94	3	27.87	26.49
Pamlico										2	15.86	15.07				2	15.86	15.07
Beaufort										2	33.13	31.47				2	33.13	31.47
Total										6	68.51	65.09	1	8.35	7.94	7	76.86	73.03
SOUTH CAROLINA.																		
Charleston										6	91.04	86.53				6	91.04	86.53
GEORGIA.																		
Savannah										3	41.76	40.75	1	10.12	9.62	4	51.88	50.37
FLORIDA.																		
Saint John's										2	49.74	47.25				2	49.74	47.25
Key West										6	122.77	116.64	1	5.32	5.05	7	128.09	121.69
Saint Mark's										4	35.22	33.45	3	29.93	28.44	7	65.15	61.89
Apalachicola										2	12.30	11.69				2	12.30	11.69
Pensacola										3	23.54	22.86				3	23.54	22.86
Total										17	243.57	231.39	4	35.25	33.49	21	278.82	264.88

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ALABAMA.																	
Mobile										3	74.87	70.66	2	25.40	24.13	5	99.77	94.79
MISSISSIPPI.																	
Pearl River										12	237.89	225.58	1	5.56	5.28	13	242.95	230.95
LOUISIANA.																	
New Orleans										5	72.52	68.89	3	21.33	20.26	8	93.85	89.15
Teche										3	83.64	32.23	2	12.14	11.54	5	45.78	43.77
Total										8	106.16	101.12	5	33.47	31.80	13	139.63	132.92
TEXAS.																	
Galveston										5	107.54	103.19	3	28.08	26.67	8	135.62	129.86
Saluria													1	6.11	5.80	1	6.11	5.80
Total										5	107.54	103.19	4	34.19	32.47	9	141.73	135.66
Total Atlantic and Gulf Coasts	5	10,165.88	9,679.15	3	2,323.22	2,207.07	1	135.66	128.88	236	19,181.42	18,233.74	110	1,807.76	1,241.96	355	33,113.94	31,490.80
THE PACIFIC COAST.																	
CALIFORNIA.																	
San Diego										1	16.59	15.76	1	9.53	9.06	2	26.12	24.82
San Francisco										16	861.84	817.32	1	11.76	11.18	17	873.60	828.50
Humboldt										1	145.26	138.00				1	145.26	138.00
Total										18	1,023.69	971.08	2	21.29	20.24	20	1,044.98	991.32
OREGON.																	
Southern Oregon										1	592.20	584.20	1	17.96	17.06	2	610.16	601.26
Oregon										1	64.12	60.92	3	39.26	37.59	4	103.38	98.51
Willamette													1	13.09	8.94	1	13.09	8.94
Total										2	656.32	645.12	5	70.31	63.59	7	726.63	708.71
WASHINGTON.																	
Puget Sound										7	1,113.58	1,050.34	1	5.42	5.15	8	1,119.00	1,055.49
Total Pacific Coast										27	2,793.59	2,666.54	8	97.02	88.98	35	2,890.61	2,755.52

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No. 19.—*Statement showing the* **CLASS, NUMBER,** *and* **TONNAGE** *of* **SAILING VESSELS BUILT** *in each* **CUSTOMS DISTRICT** *of the* **UNITED STATES** *during the* **Year** *ending June 30,* **1886**—Continued.

STATES AND CUSTOMS DISTRICTS IN IN WHICH BUILT.	SHIPS.			BARKS AND BARKENTINES.			BRIGS.			SCHOONERS.			SLOOPS.			TOTAL.		
	No.	Tons.		No.	Tons.		No.	Tons.		No.	Tons.		No.	Tons.		No.	Tons.	
		Gross.	Net.		Gross.	Net.		Gross.	Net.		Gross.	Net.		Gross.	Net.		Gross.	Net.
THE NORTHERN LAKES.																		
NEW YORK.																		
Cape Vincent													1	33.90	32.24	1	32.90	32.24
Genesee										1	8.70	8.27				1	8.70	8.27
Total										1	8.70	8.27	1	33.90	32.24	2	42.68	40.51
MICHIGAN.																		
Detroit										1	991.34	956.57				1	991.34	956.57
Huron										4	3,650.25	3,467.76				4	3,650.25	3,467.76
Superior										1	290.97	277.25				1	290.97	277.25
Michigan										5	203.90	194.09	1	41.63	39.55	6	245.53	233.64
Total										11	5,136.46	4,895.67	1	41.63	39.55	12	5,178.09	4,935.22
MINNESOTA.																		
Duluth										1	11.62	11.04				1	11.62	11.04
Total Northern Lakes										13	5,156.78	4,914.98	2	75.56	71.79	15	5,232.34	4,986.77

SUMMARY.

Atlantic and Gulf Coasts	5	10,165.88	9,679.15	3	2,323.22	2,207.07	1	135.66	128.88	236	19,181.42	18,223.74	110	1,307.76	1,241.96	355	33,113.94	31,490.80
Pacific Coast										27	2,793.59	2,656.54	8	97.02	88.98	35	2,890.61	2,755.52
Northern Lakes										13	5,156.78	4,914.98	2	75.56	71.79	15	5,232.34	4,986.77
Grand total	5	10,165.88	9,679.15	*3	2,323.22	2,207.07	1	135.66	128.88	276	27,131.79	25,815.26	120	1,480.34	1,402.73	405	41,236.89	39,233.09

*1 bark 835.07—793.29; 2 barkentines 1,488.18—1,413.78.

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No. 20.—SUMMARY *statement of the Class, Number, and Tonnage of* **SAILING VESSELS BUILT** *in the* **UNITED STATES** *during the* **Year** *ending June* 30, 1886.

CLASS OF VESSELS.	No.	Tons.	
		Gross.	Net.
Ships	5	10,165.88	9,679.15
Barks	1	835.04	793.29
Barkentines	2	1,488.18	1,413.78
Brigs	1	135.66	128.88
Schooners	276	27,131.79	25,815.26
Sloops	120	1,480.34	1,402.73
Total	405	41,236.89	39,233.09

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No. 21.—*Statement showing the Class, Number, and Tonnage of* **STEAM VESSELS** *ending June*

STATES AND CUSTOMS DISTRICTS IN WHICH BUILT.	RIVER STEAMERS.								
	SIDE-WHEEL.			STERN-WHEEL.			PROPELLER.		
	No.	Tons.		No.	Tons.		No.	Tons.	
		Gross.	Net.		Gross.	Net.		Gross.	Net.
THE ATLANTIC AND GULF COASTS.									
MAINE.									
Bangor							2	110.09	73.54
Wiscasset							1	46.27	26.97
Bath							2	315.09	157.55
Kennebunk							1	291.50	197.46
Total							6	762.95	455.52
MASSACHUSETTS.									
Gloucester							1	22.05	12.07
Boston and Charlestown							4	208.21	106.89
Fall River	1	16.26	12.38						
Total	1	16.26	12.38				5	230.26	118.96
RHODE ISLAND.									
Bristol and Warren							1	51.88	27.75
CONNECTICUT.									
Stonington	1	2,554.65	1,800.97						
New Haven				1	30.25	15.12	2	177.59	101.82
Fairfield							5	329.82	186.88
Total	1	2,554.65	1,800.97	1	30.25	15.12	7	507.41	288.70
NEW YORK.									
New York	2	1,685.79	1,229.51				27	1,490.55	880.32
NEW JERSEY.									
Newark							1	175.61	160.45
Burlington							1	89.30	85.33
Total							2	264.91	245.78
PENNSYLVANIA.									
Philadelphia							16	1,265.52	695.80
DELAWARE.									
Delaware	2	1,475.96	1,020.70				3	673.74	497.58
MARYLAND.									
Baltimore							3	650.99	537.22
VIRGINIA.									
Norfolk and Portsmouth							2	40.34	23.99
NORTH CAROLINA.									
Albemarle	1	16.81	8.66						
Pamlico							1	128.49	82.93
Wilmington				1	86.84	48.95	1	102.48	56.65
Total	1	16.81	8.66	1	86.84	48.95	2	230.97	139.58

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BUILT *in each* **CUSTOMS DISTRICT** *of the United States during the* **Year** 30, **1886.**

LAKE STEAMERS.						OCEAN STEAMERS.						TOTAL.		
SIDE-WHEEL.			PROPELLER.			SIDE-WHEEL.			PROPELLER.					
No.	Tons.		No.	Tons.		No.	Tons.		No.	Tons.		No.	Tons.	
	Gross.	Net.		Gross.	Net.		Gross.	Net.		Gross.	Net.		Gross.	Net.
												2	110.09	73.54
						1	179.25	89.63				2	225.52	116.60
												2	315.09	157.55
												1	291.50	197.46
						1	179.25	89.63				7	942.20	545.15
												1	23.05	12.07
												4	208.21	106.89
												1	16.26	12.38
												6	246.52	131.34
												1	51.88	27.95
												1	2,554.65	1,800.97
												3	297.84	116.94
												5	329.52	186.88
												9	3,092.31	2,104.79
												29	3,176.34	2,109.83
												1	175.61	160.45
												1	89.30	85.33
												2	264.91	245.78
									3	4,852.19	3,512.81	19	6,117.71	4,208.61
												5	2,149.70	1,518.28
									1	1,413.82	1,012.74	4	2,064.81	1,518.28
												2	40.34	23.99
												1	16.81	8.66
												1	123.49	82.93
												2	189.32	105.60
												4	334.62	197.19

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No. 21.—*Statement showing the Class, Number, and Tonnage of* **STEAM VESSELS** *ending June 30,*

STATES AND CUSTOMS DISTRICTS IN WHICH BUILT.	RIVER STEAMERS.								
	SIDE-WHEEL.			STERN-WHEEL.			PROPELLER.		
	No.	Tons.		No.	Tons.		No.	Tons.	
		Gross.	Net.		Gross.	Net.		Gross.	Net.
THE ATLANTIC AND GULF COASTS—Continued.									
FLORIDA.									
Saint John's				1	63.42	50.87	3	62.76	47.98
Key West				1	33.35	16.68			
Saint Mark's				2	84.76	31.86			
Apalachicola				1	109.73	109.73			
Total				5	241.26	209.14	3	62.76	47.98
ALABAMA.									
Mobile				3	275.67	275.67			
LOUISIANA.									
Teche				1	35.35	29.35			
Total Atlantic and Gulf Coasts	7	5,749.47	4,072.22	11	669.37	578.23	77	6,232.28	3,959.38
THE PACIFIC COAST.									
CALIFORNIA.									
San Francisco				4	1,162.80	891.52			
Humboldt				1	57.70	39.00			
Total				5	1,220.50	930.52			
OREGON.									
Oregon							1	33.02	16.51
Willamette				3	468.98	421.93	5	122.86	73.92
Total				3	468.98	421.93	6	155.88	90.43
WASHINGTON.									
Puget Sound				2	188.12	122.41	2	47.90	26.79
Total Pacific Coast				10	1,877.60	1,474.86	8	203.78	117.22
THE NORTHERN LAKES.									
VERMONT.									
Vermont									
NEW YORK.									
Oswegatchie							2	50.07	29.89
Cape Vincent							1	6.61	4.20
Oswego							1	13.51	6.75
Genesee							1	14.46	7.23
Buffalo Creek							7	355.16	215.06
Total							12	439.81	263.04
PENNSYLVANIA.									
Erie							1	13.78	6.89
OHIO.									
Cuyahoga							1	14.76	7.38
Sandusky				1	124.18	91.80	4	95.46	60.47
Total				1	124.18	91.80	5	110.22	67.85

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BUILT *in each* **CUSTOMS DISTRICT** *of the United States during the* **Year 1886**—Continued.

LAKE STEAMERS.						OCEAN STEAMERS.						TOTAL.		
SIDE-WHEEL.			PROPELLER.			SIDE-WHEEL.			PROPELLER.					
No.	Tons.		No.	Tons.		No.	Tons.		No.	Tons.		No.	Tons.	
	Gross.	Net.		Gross.	Net.		Gross.	Net.		Gross.	Net.		Gross.	Net.
												4	126.18	98.85
												1	33.35	16.68
												2	34.76	31.86
												1	109.73	109.73
												8	304.02	257.12
												3	275.67	275.67
												1	35.35	29.85
						1	179.25	89.63	4	6,266.01	4,525.55	100	19,096.38	13,225.01
									4	818.74	580.57	8	1,981.54	1,472.39
												1	57.70	39.00
									4	818.74	580.57	9	2,039.24	1,511.39
												1	33.02	16.51
												8	591.84	495.85
												9	624.86	512.36
									1	123.19	61.60	5	359.21	210.80
									5	941.93	942.47	23	3,023.31	2,234.55
			1	37.50	18.85							1	37.50	18.85
												2	50.07	29.83
												1	6.61	4.20
												1	13.51	6.75
												1	14.46	7.23
												7	355.16	215.03
												12	439.81	263.04
												1	13.78	6.89
1	538.20	402.11	3	5,113.25	4,327.99							5	5,666.21	4,737.48
												5	219.64	152.27
1	538.20	402.11	3	5,113.25	4,327.99							10	5,885.85	4,889.75

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No. 21.—*Statement showing the Class, Number, and Tonnage of* **STEAM VESSELS** *ending June 30,*

STATES AND CUSTOMS DISTRICTS IN WHICH BUILT.	RIVER STEAMERS.								
	SIDE-WHEEL.			STERN-WHEEL.			PROPELLER.		
	No.	Tons.		No.	Tons.		No.	Tons.	
		Gross.	Net.		Gross.	Net.		Gross.	Net.
THE NORTHERN LAKES—Continued.									
MICHIGAN.									
Detroit									
Huron									
Superior							1	17.38	11.02
Michigan							7	216.59	122.18
Total							8	233.97	133.20
ILLINOIS.									
Chicago							3	89.37	44.69
WISCONSIN.									
Milwaukee							3	122.05	66.95
Total Northern Lakes				1	124.18	91.80	32	1,009.20	582.62
THE WESTERN RIVERS.									
LOUISIANA.									
New Orleans				1	36.80	36.80	1	59.07	29.54
MISSISSIPPI.									
Vicksburg				2	63.80	47.74			
TENNESSEE.									
Memphis	3	271.78	271.78	5	546.49	537.81			
Nashville				2	131.67	70.77			
Chattanooga				2	505.91	294.65			
Total	3	271.78	271.78	9	1,184.07	903.23			
KENTUCKY.									
Paducah				2	305.20	157.75			
Louisville	1	714.87	664.93	10	1,555.00	1,555.00			
Total	1	714.87	664.93	12	1,860.20	1,712.75			
MISSOURI.									
Saint Louis	1	14.04	12.48	1	72.64	72.64			
Kansas City				1	25.81	25.81			
Total	1	14.04	12.48	2	98.45	98.45			
NEBRASKA.									
Omaha				2	50.52	45.83			
IOWA.									
Burlington				2	144.07	144.07			
Dubuque				2	260.35	260.35			
Total				4	404.42	404.42			
MINNESOTA.									
Minnesota				2	212.55	212.55	1	22.65	16.65

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BUILT *in each* **CUSTOMS DISTRICT** *of the United States during the* **Year 1886**—Continued.

LAKE STEAMERS.						OCEAN STEAMERS.						TOTAL.		
SIDE-WHEEL.			PROPELLER.			SIDE-WHEEL.			PROPELLER.					
No.	Tons.		No.	Tons.		No.	Tons.		No.	Tons.		No.	Tons.	
	Gross.	Net.		Gross.	Net.		Gross.	Net.		Gross.	Net.		Gross.	Net.
1	1, 923. 95	1, 324. 49										1	1, 923. 95	1, 324. 49
			5	3, 000. 57	2. 197. 51							5	3, 000. 57	2, 197. 51
												1	17. 38	11. 02
												7	216. 59	122. 18
1	1, 923. 95	1, 324. 49	5	3, 000. 57	2, 197. 51							14	5, 158. 49	3, 655. 20
												3	89. 37	44. 69
			3	901. 38	690. 67							6	1, 023. 43	1, 023. 43
2	2, 462. 15	1. 726. 60	12	9, 052. 90	7, 235. 02							47	12, 648. 43	9, 636. 04
												2	95. 87	66. 84
												2	63. 80	47. 74
												8	818. 27	809. 59
												2	131. 67	70. 77
												2	505. 91	294. 65
												12	1, 455. 85	1, 175. 01
												2	305. 20	157. 75
												11	2, 269. 87	2, 219. 93
												13	2, 575. 07	2, 377. 68
												2	86. 68	85. 12
												1	25. 81	25. 81
												3	112. 49	110. 93
												2	50. 52	45. 83
												2	144. 07	144. 07
												2	260. 35	260. 35
												4	404. 42	404. 42
												3	235. 20	229. 20

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No. 21.—*Statement showing the Class, Number, and Tonnage of* **STEAM VESSELS** *ending June* 30,

STATES AND CUSTOMS DISTRICTS IN WHICH BUILT.	RIVER STEAMERS.								
	SIDE-WHEEL.			STERN-WHEEL.			PROPELLER.		
	No.	Tons.		No.	Tons.		No.	Tons.	
		Gross.	Net.		Gross.	Net.		Gross.	Net.
THE WESTERN RIVERS—Continued.									
WISCONSIN.									
La Crosse	1	24.47	24.47	2	90.88	90.88	1	27.22	27.22
INDIANA.									
Evansville	....	.....	.....	1	235.20	159.40	....	.....	.....
OHIO.									
Cincinnati	....	.....	.....	4	718.04	704.85	....	.....	.....
WEST VIRGINIA.									
Wheeling	1	39.93	24.38	6	653.69	636.28	1	30.63	15.32
PENNSYLVANIA.									
Pittsburgh	1	268.33	217.82	11	2,618.09	2,063.72	....	.....	.....
Total Western Rivers	8	1,333.42	1,215.86	58	8,226.71	7,116.90	4	139.57	88.73
SUMMARY.									
Atlantic and Gulf Coasts	7	5,749.47	4,072.22	11	669.37	578.23	77	6,282.28	3,959.38
Pacific Coast	....	.....	.....	10	1,877.60	1,474.86	8	203.78	117.22
Northern Lakes	....	.....	.....	1	124.18	91.80	32	1,009.20	582.62
Western Rivers	8	1,333.42	1,215.86	58	8,226.71	7,116.90	4	139.57	88.73
Grand total	15	7,082.89	5,288.08	80	10,897.86	9,261.79	121	7,584.83	4,747.95

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BUILT *in each* **CUSTOMS DISTRICT** *of the United States during the* **Year 1886**—Continued.

LAKE STEAMERS.						OCEAN STEAMERS.						TOTAL.		
SIDE-WHEEL.			PROPELLER.			SIDE-WHEEL.			PROPELLER.					
No.	Tons.		No.	Tons.		No.	Tons.		No.	Tons.		No.	Tons.	
	Gross.	Net.		Gross.	Net.		Gross.	Net.		Gross.	Net.		Gross.	Net.
...	.....	.....	...	.....	.....	...	.....	.....	...	.....	.....	4	142.57	142.57
...	.....	.....	...	.....	.....	...	.....	.....	...	.....	.....	1	235.20	159.40
...	.....	.....	...	.....	.....	...	.....	.....	...	.....	.....	4	718.04	704.85
...	.....	.....	...	.....	.....	...	.....	.....	...	.....	.....	8	724.25	675.98
...	.....	.....	...	.....	.....	...	.....	.....	...	.....	.....	12	2,886.42	2,886.42
...	.....	.....	...	.....	.....	...	.....	.....	...	.....	.....	70	9,099.70	8,421.49
...	.....	.....	...	.....	.....	1	179.25	89.63	4	6,266.01	4,525.55	100	19,096.38	18,225.01
...	.....	.....	...	.....	.....	...	.....	.....	5	941.93	642.47	23	3,023.31	2,234.55
22	2,462.15	1,726.60	12	9,052.90	7,235.02	...	.....	.....	...	.....	.....	47	12,648.43	9,636.04
...	.....	.....	...	.....	.....	...	.....	.....	...	.....	.....	70	9,099.70	8,421.49
22	2,462.15	1,726.60	12	9,052.90	7,235.02	1	179.25	89.63	9	7,207.94	5,168.02	240	44,467.82	33,517.09

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No. 22.—*Summary Statement of Class, Number, and Tonnage of* **STEAM VESSELS BUILT** *in the United States during the* **Year** *ending June* 30, **1886.**

CLASS OF VESSELS.	No.	Tons.	
		Gross.	Net.
RIVER STEAMERS:			
Side-wheel	15	7,062.89	5,288.06
Stern-wheel	80	10,897.86	9,261.79
Propellers	121	7,584.83	4,747.95
LAKE STEAMERS:			
Side-wheel	2	2,462.15	1,726.60
Propellers	12	9,052.90	7,235.02
OCEAN STEAMERS:			
Side-wheel	1	179.25	89.63
Propellers	9	7,207.94	5,168.02
Total	240	44,467.82	33,517.09

No. 23.—*Summary Statement of* **CANAL-BOATS** *and* **BARGES BUILT** *in the United States during the* **Year** *ending June* 30, **1886.**

CLASS OF VESSELS.	No.	Tons.	
		Gross.	Net.
Canal-boats	23	2,978.83	2,502.17
Barges	47	6,769.85	6,578.70
Total	70	9,748.68	9,080.87

No. 24.—*Statement showing the Class, Number, and Tonnage of* **IRON** *and* **STEEL VESSELS BUILT** *in the United States during the* **Year** *ending June* 30, **1886.**

PORTS.	SAILING VESSELS.			STEAM VESSELS.			TOTAL.		
	No.	Tons.		No.	Tons.		No.	Tons.	
		Gross.	Net.		Gross.	Net.		Gross.	Net.
New York, N. Y				3	1,807.06	1,385.15	3	1,807.06	1,385.15
Buffalo, N. Y				1	17.21	8.03	1	17.21	8.03
Philadelphia, Pa	1	43.20	41.04	11	5,832.18	4,046.63	12	5,875.38	4,087.67
Pittsburgh, Pa				1	134.28	96.27	1	134.28	96.27
Wilmington, Del	1	75.77	71.99	3	2,123.98	1,505.19	4	2,199.75	1,577.18
Alexandria, Va	1	573.47	544.80				*1	573.47	544.80
Dubuque, Iowa				1	96.72	96.72	1	96.72	96.72
Detroit, Mich				1	1,923.95	1,324.49	†1	1,923.95	1,324.49
Cleveland, Ohio				2	2,280.10	1,867.59	‡2	2,280.10	1,867.59
Total	3	692.44	657.83	23	14,215.48	10,330.07	26	14,907.92	10,987.90

* Rebuilt from United States steamer Frolic.
† Steel.
‡ Including 1 steel vessel, 1,741.90 gross, 1,465.48 net.

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No. 25.—TONNAGE of VESSELS BUILT in the UNITED STATES, from 1857 to 1886, inclusive.

YEAR ENDING JUNE 30—	TONNAGE BUILT.				
	On the New England coast.	On the entire seaboard.	On the Mississippi River and its tributaries.	On the Great Lakes.	Total.
	Tons.	*Tons.*	*Tons.*	*Tons.*	*Tons.*
1857	183, 625	285, 453	41, 854	51, 498	378, 805
1858	103, 862	177, 412	35, 659	31, 642	244, 713
1859	79, 322	133, 294	17, 128	6, 180	156, 602
1860	134, 280	169, 836	32, 970	11, 992	214, 798
1861	104, 675	179, 767	29, 960	23, 467	233, 194
1862	45, 595	112, 487	8, 785	53, 804	175, 076
1863	79, 576	215, 667	27, 407	67, 972	311, 046
1864	112, 611	310, 421	56, 169	49, 151	415, 741
1865	133, 040	291, 306	66, 576	36, 641	394, 523
1866	121, 333	232, 388	70, 555	33, 204	336, 147
1867	135, 189	230, 810	35, 106	39, 679	305, 595
1868	98, 708	175, 812	52, 695	56, 798	285, 305
1869	103, 604	191, 194	34, 576	49, 460	275, 230
1870	110, 584	182, 836	56, 859	37, 258	276, 953
1871	64, 366	156, 249	73, 081	43, 897	273, 227
1872	46, 269	128, 097	36, 344	44, 611	209, 052
1873	76, 406	218, 139	48, 659	92, 448	359, 246
1874	136, 251	277, 093	63, 646	91, 986	432, 725
1875	151, 497	244, 474	23, 294	29, 871	297, 639
1876	95, 288	163, 826	23, 636	16, 124	203, 586
1877	90, 992	132, 996	34, 693	8, 903	176, 592
1878	90, 386	155, 138	68, 928	11, 438	235, 504
1879	55, 874	115, 683	62, 213	15, 135	193, 031
1880	46, 374	101, 720	32, 791	22, 899	157, 410
1881	54, 488	125, 706	81, 189	73, 504	280, 459
1882	93, 965	188, 054	35, 817	58, 369	282, 270
1883	110, 226	210, 349	26, 443	28, 638	265, 430
1884	84, 046	178, 419	16, 664	30, 431	225, 514
1885	48, 128	121, 010	11, 220	26, 826	159, 056
1886	30, 624	64, 458	10, 595	20, 400	95, 453

No. 26.—*Comparison of the* TONNAGE *of* VESSELS BUILT *in the* UNITED STATES *during the* PAST TWO YEARS.

	1885.	1886.	Decrease in 1886.
	Tons.	*Tons.*	*Tons.*
New England Coast	48, 128	30, 624	17, 504
Middle Atlantic and Gulf Coasts	61, 844	27, 920	33, 924
Pacific Coast	11, 088	5, 914	5, 124
Northern Lakes	26, 826	20, 400	6, 426
Western Rivers	11 220	10, 595	625
Total	159, 056	95, 453	63, 603

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No. 27.—*Statement showing the Class, Number, and Tonnage of* **SAILING and STEAM VESSELS BUILT** *in the United States, from* **1797** *to* **1886,** *inclusive.*

YEAR ENDING—	CLASS, NUMBER, AND TONNAGE.								TOTAL.	
	Sailing vessels.						Steam vessels.			
	Ships and barks.	Brigs.	Schooners.	Sloops, canal boats, and barges.	Total number.	Tons.	Number.	Tons.	Number.	Tons.
Dec. 31, 1797										57,679.09
1798	34	53	401	147	635				635	49,435.04
1799	87	131	382	167	767				767	77,921.78
1800	128	176	487	204	995				995	106,261.56
1801										124,755.28
1802*										
1803										88,448.40
1804										103,752.91
1805										128,507.03
1806										126,603.29
1807										99,783.92
1808										31,755.34
1809										91,397.55
1810										127,575.86
1811										146,691.82
1812						84,091.42	4	457.08		85,148.50
1813	3	21	212	128	364	31,153.40	7	1,429.66	371	32,583.11
1814	8	11	312	162	488	29,039.90	2	711.65	490	29,751.60
1815	136	224	680	284	1,324	154,624.39	5	954.65	1,329	155,579.09
1816	76	133	781	424	1,414	131,667.86	17	3,518.89	1,431	135,186.80
1817	34	90	559	394	1,077	86,293.37	10	1,333.28	1,087	87,626.65
1818	53	85	428	332	898	82,421.20	25	4,925.29	923	87,346.49
1819	53	82	473	240	848	79,479.14	28	7,290.74	876	86,670.24
1820	22	60	301	152	535	47,784.01	22	3,610.58	557	51,394.59
1821	43	89	248	127	507	55,816.02	12	1,419.10	519	57,275.12
1822	64	131	260	168	623	75,216.93	16	2,222.31	639	77,569.29
1823	55	127	260	165	607	72,758.49	23	3,099.16	630	75,857.65
1824	56	156	377	166	755	86,851.72	38	5,946.28	793	92,798.05
1825	56	197	538	168	959	109,546.73	41	6,917.65	1,000	116,464.43
1826	71	187	482	227	967	118,094.37	66	12,279.30	1,033	130,373.67
1827	58	135	464	242	899	97,474.80	52	8,981.70	951	106,456.55
1828	73	108	474	197	852	92,879.28	34	6,085.03	886	98,964.31
1829	44	68	484	145	741	68,216.44	55	11,192.18	796	79,408.62
1830	25	56	403	116	600	51,491.51	48	7,068.89	648	58,560.45
1831	72	95	416	94	677	80,231.14	35	5,325.44	712	85,556.58
1832	132	143	568	122	965	129,143.03	100	15,401.13	1,065	144,544.16
1833	144	169	624	185	1,122	150,758.05	65	10,734.25	1,187	161,492.30
1834	98	94	497	180	869	105,332.54	88	13,057.30	957	118,389.84
Sept. 30, 1835	43	55	391	164	653	64,338.13	72	10,769.76	725	75,107.89
1836	98	65	444	164	766	93,016.79	145	23,218.57	911	116,230.41
1837	67	72	507	168	814	92,458.49	158	33,455.09	972	125,913.58
1838	66	79	510	153	808	91,747.79	105	24,158.09	913	115,905.88
1839	88	89	439	124	735	100,363.10	164	24,897.59	899	125,260.69
1840	97	109	378	224	808	106,518.35	87	14,685.51	895	121,203.86
1841	114	102	319	150	685	100,117.12	108	23,543.81	793	123,660.93
1842	116	91	274	606	887	105,256.15	140	24,550.15	1,027	129,806.30
June 30, 1843	58	34	138	174	404	50,050.52	79	13,837.67	483	63,888.24
1844	73	47	204	279	603	71,506.96	163	32,030.58	766	103,537.29
1845	124	87	322	342	875	112,362.08	163	33,640.38	1,038	146,042.46
1846	100	164	576	355	1,195	141,844.22	225	46,359.71	1,420	188,203.93
1847	151	168	689	392	1,400	193,403.38	197	50,230.02	1,597	243,633.40
1848	254	174	701	547	1,676	265,549.53	175	52,526.01	1,851	318,075.54
1849	198	148	623	370	1,339	213,970.81	215	43,018.01	1,554	256,988.82
1850	247	117	551	307	1,225	227,997.51	197	51,258.35	1,422	279,255.86
1851	211	65	522	325	1,123	221,145.89	245	78,326.47	1,368	299,472.41
1852	255	79	585	265	1,184	269,821.81	268	85,534.33	1,452	355,356.19
1853	270	95	681	391	1,437	332,339.12	280	95,155.67	1,717	427,494.79
1854	334	112	661	386	1,493	447,216.26	284	88,829.82	1,777	536,046.13
1855	381	126	605	669	1,781	510,689.67	246	72,760.32	2,027	583,450.04
1856	306	103	594	479	1,482	404,054.39	232	65,239.34	1,714	469,293.73
1857	251	58	504	358	1,171	304,345.18	272	74,459.52	1,443	378,804.70
1858	123	46	431	400	999	179,338.53	242	65,374.34	1,241	244,712.87
1859	89	28	297	284	698	121,296.83	177	35,305.45	875	156,602.28

* No record.

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No. 27.—*Statement showing the Class, Number, and Tonnage of* **SAILING** *and* **STEAM VESSELS BUILT** *in the United States, from* **1797** *to* **1886,** *inclusive*—Continued.

YEAR ENDING—	CLASS, NUMBER, AND TONNAGE.								TOTAL.	
	Sailing vessels.						Steam vessels.			
	Ships and barks.	Brigs.	Schooners.	Sloops, canal-boats, and barges.	Total number.	Tons.	Number.	Tons.	Number.	Tons.
June 30, 1860	110	36	372	289	807	145,427.58	275	69,370.07	1,082	214,797.65
1861	110	39	360	371	880	172,207.94	266	60,986.36	1,146	233,194.35
1862	60	17	207	397	681	119,626.67	183	55,449.17	864	175,075.84
1863	97	34	212	1,113	1,456	216,812.14	360	94,233.67	1,816	311,045.81
1864	112	45	322	1,389	1,868	268,240.76	520	147,499.83	2,388	415,740.64
1865	109	46	370	853	1,378	248,904.35	411	145,696.35	1,789	394,600.70
1866	96	61	457	926	1,540	210,962.84	358	125,183.72	1,898	336,146.56
1867	95	70	517	657	1,339	233,584.53	179	72,010.33	1,518	305,594.86
1868	80	48	590	848	1,566	221,364.67	236	63,940.06	1,802	285,304.73
1869	91	36	501	820	1,448	210,164.16	279	65,065.99	1,727	275,230.15
1870	73	27	519	709	1,328	206,332.39	290	70,620.92	1,616	276,953.31
1871	40	14	498	901	1,453	185,384.02	302	87,842.49	1,755	273,226.51
1872	15	10	426	900	1,351	146,842.57	292	62,209.65	1,643	209,052.22
1873	28	9	611	1,221	1,869	271,235.10	402	88,010.66	2,271	359,245.76
1874	71	22	655	995	1,743	330,795.25	404	101,929.92	2,147	432,725.17
1875	114	22	502	340	978	235,178.95	323	62,459.84	1,301	297,638.79
1876	76	5	424	269	774	134,333.72	338	69,251.91	1,112	203,585.63
1877	71	4	337	352	764	120,077.45	265	47,514.51	1,029	176,591.06
1878	81	7	379	557	924	153,643.97	334	81,859.60	1,258	235,503.57
1879	37	10	256	494	797	106,669.34	335	86,361.35	1,132	193,030.69
1880	23	2	286	243	554	78,556.20	348	78,853.70	902	157,409.90
1881	29	3	318	314	664	162,388.09	444	118,070.55	1,108	280,458.64
1882	31	2	473	363	869	160,427.07	502	121,842.66	1,371	282,269.73
1883	33	2	507	227	829	158,200.13	439	107,229.78	1,268	265,429.91
1884	24	2	533	221	780	134,186.53	410	91,327.47	1,190	225,514.00
1885	11	.....	379	192	582	74,723.44	338	84,332.75	920	159,056.19
1886	8	1	276	190	475	50,985.57	240	44,467.82	715	95,453.39

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No. 28.—*Statement showing the Tonnage of* **VESSELS** *of the United States* **SOLD** *to* **FOREIGNERS** *during each year from* **1821** *to* **1886,** *inclusive.*

Year ending—	Registered.	Enrolled and licensed.	Total.	Year.	Registered.	Enrolled and licensed.	Total.
	Tons.	*Tons.*	*Tons.*		*Tons.*	*Tons.*	*Tons.*
Dec. 31, 1821	8,350	.....	8,350	1854	59,244	789	60,033
1822	5,710	.....	5,710	1855	65,887	.....	65,887
1823	9,269	.....	9,269	1856	41,854	314	42,168
1824	12,818	.....	12,818	1857	51,791	858	52,649
1825	9,949	.....	9,949	1858	25,926	379	26,305
1826	13,994	.....	13,994	1859	30,765	85	30,850
1827	19,043	.....	19,043	1860	17,073	345	17,418
1828	14,678	.....	14,678	1861	26,508	146	26,649
1829	14,093	.....	14,093	1862	114,939	2,817	117,756
1830	10,059	.....	10,059	1863	217,126	5,073	222,199
1831	9,750	.....	9,750	1864	291,383	9,482	300,865
1832	6,083	.....	6,083	1865	128,197	5,625	133,832
1833	2,932	.....	2,932	1866	21,678	439	22,117
1834	4,725	.....	4,725	1867	9,016	72	9,088
Sept. 30, 1835	7,617	.....	7,617	1868	10,664	3,093	13,757
1836	10,509	.....	10,509	1869	18,652	411	19,063
1837	9,916	.....	9,916	1870	16,545	534	17,079
1838	5,386	.....	5,386	1871	10,768	2,766	13,534
1839	5,769	.....	5,769	1872	18,637	935	19,572
1840	13,837	.....	13,837	1873	27,995	1,768	29,763
1841	12,713	.....	12,713	1874	73,215	3,839	77,054
1842	7,770	.....	7,770	1875	22,557	2,984	25,541
June 30, 1843	8,818	385	9,203	1876	29,808	3,445	33,253
1844	7,227	.....	7,227	1877	22,459	2,265	24,724
1845	8,023	846	8,869	1878	36,872	6,735	43,607
1846	10,932	.....	10,932	1879	37,518	5,794	43,312
1847	13,908	3,061	16,969	1880	19,152	7,731	26,883
1848	11,079	1,377	12,456	1881	27,254	1,417	28,671
1849	12,506	115	12,621	1882	15,166	3,091	18,257
1850	13,468	.....	13,468	1883	34,729	2,656	37,385
1851	15,247	.....	15,247	1884	26,547	2,175	28,722
1852	17,612	309	17,921	1885	21,961	4,252	26,213
1853	10,035	.....	10,035	1886	31,617	1,446	33,063

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APPENDICES.

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APPENDIX No. 1.

REPORTS OF THE SHIPPING COMMISSIONERS.

In reply to interrogatories submitted by the Commissioner of Navigation to shipping officers at the principal ports respecting the practical effect of recent legislation upon seamen, and other matters relative to the nationality and character of the crews employed in the merchant service, as well as detailed accounts of the work performed, officers and men shipped, fees collected, &c, during the year ended June 30, 1886. the subsequent reports have been received.

List of interrogatories.

FIRST.

State the number of vessels for which you have engaged crews, and the number of men shipped at your office during the year ending June 30, 1886, classed as officers and seamen, the latter to include all grades "not officers," excepting firemen or stokers, which specify separately; and give approximately the proportion of native and foreign born persons employed.

SECOND.

State, as above, number of vessels and men bound on foreign voyages and required to pay the statutory fees.

THIRD.

State, as above, number of vessels and men bound on foreign voyages.

FOURTH.

State the number of crews and men paid off from coastwise voyages, as above.

FIFTH.

State number of crews and of men (all told) discharged from foreign voyages.

SIXTH.

State the average number of men (all told) to 100 tons register in vessels of different size, and in what capacities.

SEVENTH.

State average wages of crews shipped each month on coastwise and foreign voyages, respectively.

EIGHTH.

State your observations as to the operations of the law prohibiting the payment of advance wages at your port during the year.

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NINTH.

State condition and habits of seamen, whether improved or otherwise, in consequence of said law.

TENTH.

State the effects of the law, if any, in improving the treatment of seamen at the sailors' boarding-houses, and the conduct of the landlords, or whether there is any change for the better in this class.

ELEVENTH.

State your views in regard to the examination and certification of officers by the Government on a plan similar to the British, and whether the adoption of such examinations would tend to improve the service and safety of navigation.

TWELFTH.

State your views as to apprentices; whether a regular organized system of apprentices would tend to increase the efficiency of the merchant marine.

THIRTEENTH.

State any information you have in relation to the general health of seamen arriving at your port.

FOURTEENTH.

State cases of insubordination on board ships, or abuse of men at sea that have come within your knowledge, or complaints by seamen as to food or water during service on board any vessel of the United States.

PORT OF NEW YORK.

OFFICE OF THE UNITED STATES SHIPPING COMMISSIONER,
New York, July 31, 1886.

SIR: I have the honor to transmit herein answers to the several questions asked in your letter of May 7.

I am, very respectfully, yours,

JAMES C. REED,
United States Shipping Commissioner.

The COMMISSIONER OF NAVIGATION,
Washington, D. C.

ANSWERS TO FIRST, SECOND, AND THIRD QUESTIONS.

Shipments.

Character of voyages.	Number of ships for which crews were engaged.	Grades of seamen engaged.			Number of seamen shipped of all grades.	Nativity.	
		Officers.	Firemen and stokers.	Seamen.		Foreign.	Native.
Foreign-bound	531	1,620	1,084	7,367	10,071	5,358	4,713
Coastwise, &c	464	52	.....	824	876	327	549
Totals	995	1,672	1,084	8,191	10,947	5,685	5,262

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ANSWERS TO FOURTH AND FIFTH QUESTIONS.

Discharges.

Character of voyages.	Number of ships for which crews were paid off.	Grades of seamen discharged.			Number of seamen discharged of all grades.	Nativity.	
		Officers.	Firemen and stokers.	Seamen.		Foreign.	Native.
Foreign-bound	613	1,695	1,342	7,456	10,493	6,270	4,223
Coastwise, &c	1	2	.....	4	6	3	3
Totals	614	1,697	1,342	7,460	10,499	6,273	4,226

ANSWER TO SIXTH QUESTION.

Average number of men shipped, per 100 tons.

Tonnage.	Vessels.	Officers.	Firemen and stokers	Seamen.	Total crew.	Total tonnage.	Average to each 100 tons.			
							Officers.	Firemen and stokers.	Seamen.	Crew.
Under 100	114	11	3	174	188	8,961	1	1/10	1 4/5	2 1/10
100 to 200	267	73	.....	453	526	39,496	1	.....	1 1/5	1 2/3
200 to 300	147	117	.....	652	759	36,372	1	.....	1 3/4	2 1/10
300 to 400	70	45	.....	326	371	24,357	1	.....	1 1/3	1 1/2
400 to 500	67	49	.....	307	356	30,456	1	.....	1	1 1/6
500 to 600	56	97	.....	377	474	32,076	1	.....	1 1/5	1 1/2
600 to 700	40	85	24	389	498	26,557	1	1/10	1 1/2	1 4/5
700 to 800	8	15	.....	77	92	6,012	1	.....	1 1/4	1 1/2
800 to 900	12	24	.....	135	159	10,288	1	.....	1 1/3	1 1/2
900 to 1,000	8	16	.....	99	115	7,542	1	.....	1 1/3	1 1/2
1,000 to 1,100	12	24	.....	167	191	12,508	1	.....	1 1/3	1 1/2
1,100 to 1,200	19	39	.....	293	332	21,629	1	.....	1 1/3	1 1/2
1,200 to 1,300	29	139	180	622	941	35,449	1	1/2	1 3/4	2 2/3
1,300 to 1,400	18	38	.....	318	356	24,437	1	.....	1 1/3	1 1/2
1,400 to 1,500	15	40	.....	290	330	21,786	1	.....	1 1/3	1 1/2
1,500 to 1,600	13	29	.....	260	289	20,015	1	.....	1 1/3	1 1/2
1,600 to 1,700	8	20	.....	156	176	13,224	1	.....	1 1/5	1 1/3
1,700 to 1,800	8	33	40	204	282	13,922	1	1/2	1 1/2	2 1/3
1,800 to 1,900	10	52	63	309	424	18,334	1	1/2	1 1/2	2 1/3
1,900 to 2,000	36	425	358	1,308	2,091	70,686	1	1/2	1 1/2	2 1/3
2,000 to 2,100	8	72	101	285	458	16,396	1	1/2	1 1/2	2 1/3
2,100 to 2,200	18	122	170	504	796	37,906	1	1/2	1 1/2	2 1/10
2,200 to 2,300	1	3	.....	24	27	2,271	1	.....	1	1 1/5
2,300 to 2,400	1	3	.....	30	33	2,341	1	.....	1 1/3	1 1/2
2,400 to 2,500	2	5	.....	59	64	4,960	1/10	.....	1 1/2	1 1/2
Over 2,500	8	91	145	383	619	21,472	2/5	2/3	1 1/2	2 2/3
Totals	995	1,672	1,084	8,191	10,947	559,543	1/11	1/5	1 1/2	1 10/11

ANSWER TO SEVENTH QUESTION.

Average wages of seamen shipped.

Months.	Average wages.		Months.	Average wages.	
	Foreign.	Coastwise.		Foreign.	Coastwise.
1885.			1886.		
July	$15 18	$19 18	January	$14 07	$13 24
August	15 95	18 09	February	15 12	16 38
September	15 38	16 48	March	14 43	16 63
October	14 40	16 86	April	11 47	19 51
November	14 12	18 00	May	14 94	21 73
December	14 68	19 12	June	16 79	16 80

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ANSWER TO SEVENTH QUESTION.

(Supplemental.)

Showing number of men shipped at different rates of wages.

Monthly rates of wages.	Number of men.		Monthly rates of wages.	Number of men.		Monthly rates of wages.	Number of men.	
	Foreign.	Coast-wise.		Foreign.	Coast-wise.		Foreign.	Coast-wise.
$150 00	2	.....	$33 00	7	.....	$17 50	23	.....
125 00	79	.....	32 50	3	.....	17 00	116	5
115 00	2	.....	32 00	12	.....	16 66	1	.....
100 00	1	.....	31 50	1	.....	16 00	124	25
90 00	45	.....	31 00	1	.....	15 00	409	21
85 00	1	.....	30 00	557	27	14 00	1,012	11
80 00	153	.....	29 50	2	.....	13 50	2	.....
75 00	61	.....	29 00	8	.....	13 00	11	.....
70 00	136	.....	28 75	9	.....	12 50	5	1
65 00	55	.....	28 50	1	.....	12 25	6	.....
60 00	198	.....	28 00	99	1	12 00	610	11
55 00	76	.....	27 50	3	.....	11 00	22	.....
52 50	1	.....	27 00	20	2	10 50	4	.....
50 00	421	.....	26 50	2	.....	10 00	824	4
48 00	1	.....	26 25	2	.....	9 00	48	.....
47 50	1	.....	26 00	17	.....	8 00	137	1
45 00	595	.....	25 50	2	.....	7 50	3	.....
44 00	1	.....	25 00	997	43	7 00	32	.....
43 50	1	.....	24 50	1	.....	6 00	4	.....
43 00	1	.....	24 00	38	.....	5 00	28	.....
42 00	1	.....	23 33	3	.....	4 00	2	.....
40 00	377	3	23 00	38	2	3 00	1	.....
39 00	1	.....	22 50	14	.....	1 00	49	1
38 60	1	.....	22 40	1	.....	50	3	.....
38 33	1	.....	22 25	1	.....	40	1	.....
38 00	7	.....	22 00	28	11	25	19	.....
37 00	6	.....	21 60	1	.....	5	1	.....
36 67	1	.....	21 00	15	.....	Run 10 00	.....	1
36 00	5	.....	20 00	1,120	337	" 7 00	.....	1
35 00	1,047	12	19 00	8	5	" 5 00	.....	2
34 00	3	.....	18 00	282	348	Shares.	.....	1

ANSWER TO EIGHTH QUESTION.

There is much circumstantial evidence to indicate that the law prohibiting the payment of wages to seamen in advance of the time when they have actually earned them is violated; but it has been difficult to secure such legal proof as seems requisite to obtain conviction.

The ship-owners, the ship-agents, the ship-masters, the sailor landlords, and the sailors themselves, are, almost without exception, opposed to the law prohibiting the payment of advance wages. In fact, every person who can be directly concerned or remotely interested in such unlawful transactions appears to regard such prohibition as an unjustifiable attempt to prescribe by law how and when he shall spend his own money.

In this state of things it is rarely possible to obtain such proof of the violation of the statute as would justify prosecution by the law officers of the United States.

But the foremost obstacle to the detection of such violations is, that the sailor, who should, in the nature of the case, be the complainant, wants a part of his wages paid in advance, and he will connive in every way to obtain them and then do all he can to conceal the payment.

ANSWER TO NINTH QUESTION.

The habits and condition of seamen in the merchant service at this port are undoubtedly improved in consequence of the abrogation of the system of paying advance wages. Many crews are shipped under circumstances that clearly indicate that no bonus advances or other unlawful inducements have been given.

In other cases, where the contrary may be suspected, it is probable that the amount of money surreptitiously given is much less than was paid when the law sanctioned such payments. In both cases the sailor has more money when he steps ashore, and is, therefore, more his own master.

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ANSWER TO TENTH QUESTION.

The seaman is better treated at the sailor boarding-houses, because, if he has taken no bonus or present at the time of his shipment, he has more money in his pocket when he is discharged. If, on the other hand, he has secretly taken some advance payment, he receives equal consideration for fear he should expose that transaction.

ANSWER TO ELEVENTH QUESTION.

A system of local boards, established by law at the principal seaports to examine the qualifications of an officer for any of the several grades in the merchant service, and to report thereon to some higher authority authorized to grant a certificate of competency, &c., would lead to improve the merchant service and enhance the safety of ships.

Of course an essential part of such system would be a requirement that no person should, under ordinary circumstances, assume any command on shipboard beyond the grade specified in his certificate.

If such local boards were also empowered to investigate complaints of unlawful punishments at sea, &c., for the purpose of recommending the suspension or forfeiture of such certificates by the authority granting them, a great stride would be made in the betterment of the condition of the merchant seamen.

ANSWER TO TWELFTH QUESTION.

A regularly organized system of apprenticeship would tend to increase the efficiency of the merchant service, provided such engagements were sought, which is doubtful. The statutes already provide a fairly good way of apprenticing boys to sea-service; but at the port of New York no boy has been indentured for some years.

The inherent conditions of sea-faring life in the merchant service seems to make the practical working of apprenticeships rather unsuitable to the occupation of mariner; but even in other trades better suited such extended engagements have generally gone out of use in the United States.

In the straitened condition of the shipping business, no master is likely to burden himself with the custody and education of an apprentice.

ANSWER TO THIRTEENTH QUESTION.

The general health of the seamen arriving at this port during the past twelve months has been good.

ANSWER TO THE FOURTEENTH QUESTION.

No cases of insubordination have been reported; a few cases of disrespectful language to superior officers have been reported and adjudicated.

Several cases of ill-treatment of seamen have been brought to the attention of the United States attorney.

No complaints of bad or insufficient food or water have been received.

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Table showing aggregate wages of persons shipped each month, and average wages each month, at the port of New York.

1885.

Engaged.	July.			August.			September.		
	No.	Total wages.	Average.	No.	Total wages.	Average.	No.	Total wages.	Average.
Officers	171	$8,529 50	$49 88	158	$7,867 16	$49 79	121	$6,187 00	$51 10
Mates:									
Foreign	112	4,510 50	40 27	106	4,167 16	39 31	75	3,022 00	40 29
Coastwise	7	179 00	25 26	4	110 00	27 50	5	130 00	26 00
Surgeons	5	330 00	66 00	5	310 00	62 00	4	260 00	65 00
Pursers	7	485 00	69 29	8	570 00	71 25	6	445 00	74 16
Engineers	32	2,655 00	82 97	28	2,390 00	85 36	24	2,020 00	84 17
Freight clerks	8	370 00	46 25	7	320 00	45 71	7	310 00	44 28
Firemen and stokers	97	3,419 00	35 25	96	3,201 00	33 34	76	2,634 00	34 66
Firemen	55	2,129 00	38 71	54	2,001 00	37 06	41	1,589 00	38 76
Stokers	42	1,290 00	30 71	42	1,200 00	28 57	35	1,045 00	29 86
Seamen	834	17,305 25	20 75	783	17,372 41	22 19	602	12,639 00	20 99
Bakers	6	285 00	47 49	7	330 00	47 14	5	240 00	48 00
Barbers	5	4 25	85	4	4 25	1 06	4	3 25	81
Boys	26	305 25	11 73	30	337 00	11 23	26	263 50	10 12
Butchers	5	170 00	34 00	4	135 00	33 75	4	135 00	33 75
Boatswains	8	245 00	30 62	9	244 00	27 11	11	252 00	22 90
Carpenters	19	576 00	30 32	21	633 00	30 14	15	478 50	31 90
Cooks:									
Foreign	78	2,628 25	33 69	61	2,577 50	42 25	46	1,588 50	34 53
Coastwise	20	510 00	25 50	17	364 00	21 41	10	225 00	22 50
Messmen	8	195 00	24 37	8	200 00	25 00	6	150 00	25 00
Oilers	23	1,100 00	47 83	24	1,155 00	48 12	18	870 00	48 33
Porters	8	235 00	29 37	8	230 00	28 75	6	180 00	30 00
Pantrymen	7	200 00	28 57	8	230 00	28 75	6	180 00	30 00
Quartermasters	22	525 00	23 86	18	585 00	32 50	19	630 00	33 16
Sailors:									
Foreign	451	6,824 00	15 13	409	6,526 00	15 95	294	4,521 00	15 38
Coastwise	71	1,362 00	19 18	64	1,158 00	18 09	65	1,071 00	16 48
Stewards	20	890 50	44 52	28	1,109 66	39 63	18	741 50	41 19
Stewardesses	8	150 00	18 75	10	180 00	18 00	7	140 00	20 00
Storekeepers	1	40 00	40 00	2	65 00	32 50	1	40 00	40 00
Water-tenders	3	150 00	50 00	6	300 00	50 00	3	150 00	50 00
Waiters	45	910 00	20 22	45	1,015 00	22 55	38	780 00	20 53

Engaged.	October.			November.			December.		
	No.	Total wages.	Average.	No.	Total wages.	Average.	No.	Total wages.	Average.
Officers	146	$7,038 67	$48 21	143	$7,656 25	$53 54	125	$6,035 46	$48 28
Mates:									
Foreign	97	3,633 67	37 46	94	3,961 25	42 14	85	3,055 46	35 95
Coastwise	7	210 00	30 00	2	50 00	25 00	3	85 00	28 33
Surgeons	5	330 00	66 00	4	260 00	65 00	3	210 00	70 00
Pursers	7	495 00	70 71	8	570 00	71 25	6	420 00	70 00
Engineers	25	2,130 00	85 20	27	2,465 00	91 29	22	1,995 00	90 68
Freight clerks	5	240 00	48 00	8	350 00	41 11	6	270 00	45 00
Firemen and stokers	81	2,823 00	34 85	110	3,710 00	33 72	78	2,690 00	34 48
Firemen	45	1,743 00	38 73	53	2,015 00	38 21	47	1,755 00	37 34
Stokers	36	1,080 00	30 00	57	1,695 00	29 74	31	935 00	30 16
Seamen	731	14,910 75	20 40	688	14,800 00	21 51	605	12,641 50	20 90
Bakers	5	235 00	47 00	7	330 00	47 14	6	275 00	45 83
Barbers	4	3 25	81	5	3 50	70	1	1 00	1 00
Boys	23	266 50	11 59	33	421 00	12 75	27	269 25	9 98
Butchers	4	135 00	33 75	6	200 00	33 33	3	105 00	35 00
Boatswains	11	275 50	25 04	17	387 00	22 77	13	288 00	22 15
Carpenters	19	566 00	29 79	18	570 50	31 69	15	514 25	34 28

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Table showing aggregate wages of persons shipped each month, &c.—Continued.

1885.

Engaged.	October.			November.			December.		
	No.	Total wages.	Average.	No.	Total wages.	Average.	No.	Total wages.	Average.
Seamen—Continued.									
Cooks:									
Foreign	52	$1,864 00	$35 85	55	$1,890 00	$34 36	45	$1,570 50	$34 88
Coastwise	19	432 00	22 74	10	283 00	28 30	11	252 50	22 95
Messmen	7	175 00	25 00	9	225 00	25 00	5	125 00	25 00
Oilers	21	1,005 00	47 86	26	1,260 00	48 46	21	960 00	45 71
Porters	7	205 00	29 28	8	230 00	28 75	6	175 00	29 16
Pantrymen	7	215 00	30 71	8	280 00	35 00	4	100 00	25 00
Quartermasters	20	640 00	32 00	27	885 00	32 78	16	540 00	33 75
Sailors:									
Foreign	378	5,444 00	14 40	339	4,788 00	14 12	328	4,814 00	14 68
Coastwise	87	1,467 00	16 86	39	702 00	18 00	33	631 00	19 12
Stewards	19	836 50	44 02	23	1,035 00	45 00	23	993 00	43 15
Stewardesses	8	136 00	17 00	8	195 00	24 37	6	105 00	17 50
Sailmakers							2	28 00	14 00
Storekeepers	2	65 00	32 50	1	40 00	40 00			
Water-tenders	6	300 00	50 00	3	150 00	50 00	3	150 00	50 00
Waiters	32	645 00	20 16	46	925 00	20 10	37	745 00	20 11

1886.

Engaged.	January.			February.			March.		
	No.	Total wages.	Average.	No.	Total wages.	Average.	No.	Total wages.	Average.
Officers	125	$6,236 50	$49 89	120	$6,267 00	$52 22	140	$6,941 50	$49 58
Mates:									
Foreign	80	2,916 50	36 46	75	3,052 00	40 69	91	3,639 50	39 99
Coastwise				2	50 00	25 00	7	202 00	28 85
Surgeons	4	260 00	65 00	4	260 00	65 00	3	190 00	63 33
Pursers	7	495 00	70 71	7	490 00	70 00	8	565 00	70 61
Engineers	27	2,255 00	83 52	25	2,115 00	84 60	23	1,985 00	86 29
Freight clerks	7	310 00	44 28	7	310 00	44 28	8	360 00	45 00
Firemen and stokers	85	2,888 00	25 74	81	2,758 00	34 04	90	3,142 79	36 03
Firemen	49	1,808 00	36 99	45	1,699 00	37 53	54	2,085 53	38 65
Stokers	36	1,080 00	30 00	36	1,059 00	29 41	36	1,057 26	29 37
Seamen	562	11,808 31	20 29	563	11,577 65	20 56	773	15,385 23	19 90
Bakers	6	285 00	47 50	6	285 00	47 50	6	285 00	47 50
Barbers	4	3 25	81	3	2 25	75	4	3 25	81
Boys	27	267 90	9 92	17	215 00	12 65	23	247 00	10 74
Butchers	4	135 00	33 75	4	135 00	33 75	3	105 00	35 00
Boatswains	9	264 00	29 33	10	266 00	26 60	12	275 00	22 92
Carpenters	16	493 66	30 85	20	580 00	29 00	25	713 50	28 54
Cooks:									
Foreign	46	1,655 00	35 98	40	1,371 00	34 27	58	1,839 10	31 71
Coastwise	3	75 00	25 00	3	57 00	19 00	8	205 00	25 62
Messmen	7	175 00	25 00	5	125 00	25 00	7	175 00	25 00
Oilers	21	990 00	47 14	19	915 00	48 16	21	1,005 00	47 86
Porters	7	205 00	29 28	6	150 00	25 00	6	180 00	30 00
Pantrymen	6	180 00	30 00	5	155 00	31 00	7	200 00	28 57
Quartermasters	22	455 00	20 68	19	630 00	33 15	21	690 00	32 86
Sailors:									
Foreign	322	4,532 00	14 07	301	4,553 00	15 12	403	5,814 98	14 43
Coastwise	13	172 00	13 24	40	655 40	16 38	91	1,512 96	16 63
Stewards	21	871 00	41 48	23	884 00	36 26	29	1,078 40	37 19
Stewardesses	8	145 00	18 12	7	124 00	17 71	7	125 00	17 96
Sailmakers							1	18 00	18 00
Storekeepers				1	40 00	40 00			
Water-tenders	3	150 00	50 00	3	150 00	50 00	3	150 00	50 00
Waiters	37	705 00	19 05	31	335 00	10 80	38	765 90	20 13

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Table showing aggregate wages of persons shipped each month, &c.—Continued.

1886.

Engaged.	April.			May.			June.		
	No.	Total wages.	Average.	No.	Total wages.	Average.	No.	Total wages.	Average.
Officers	166	$8,697 00	$52 39	131	$6,948 50	$53 04	127	$6,868 50	$54 08
Mates:									
Foreign	101	4,092 00	40 51	78	3,208 50	41 13	71	3,081 50	42 69
Coastwise	7	220 00	31 43	3	85 00	28 33	6	172 00	28 66
Surgeons	6	390 00	65 00	6	380 00	63 33	5	310 00	62 00
Pursers	9	675 00	75 00	6	485 00	80 83	7	495 60	70 71
Engineers	34	2,920 00	85 88	28	2,350 00	83 92	29	2,470 00	85 17
Freight clerks	9	400 00	44 44	10	440 00	44 00	9	390 00	43 33
Firemen and stokers	111	4,019 00	36 21	98	3,475 00	37 87	86	2,969 00	34 53
Firemen	63	2,534 00	40 22	52	2,150 00	41 35	51	1,924 00	37 73
Stokers	48	4,185 00	30 94	41	1,325 00	32 32	35	1,045 00	29 86
Seamen	786	16,044 18	20 41	653	14,281 75	21 87	581	12,567 50	23 35
Bakers	8	365 00	45 63	6	290 00	48 33	7	330 00	47 14
Barbers	5	4 25	85	5	4 25	85	2	2 00	1 00
Boys	23	281 25	12 23	26	310 00	11 92	20	273 00	13 65
Butchers	7	240 00	34 29	4	140 00	35 00	4	135 00	33 75
Boatswains	11	333 00	30 27	9	244 00	27 11	8	245 00	30 63
Carpenters	23	744 00	33 82	20	617 00	30 85	12	421 00	35 08
Cooks:									
Foreign	63	2,007 00	31 86	51	1,847 00	36 22	39	1,568 50	40 22
Coastwise	9	235 00	26 10	5	125 00	25 00	8	213 00	26 63
Messmen	9	225 00	25 00	7	175 00	25 00	8	200 00	25 00
Oilers	27	1,305 00	48 33	21	1,029 00	48 57	24	1,155 00	48 12
Porters	9	275 00	30 56	6	155 00	25 83	8	230 00	28 75
Pantrymen	10	295 00	29 50	9	260 00	28 88	8	230 00	28 75
Quartermasters	29	970 00	33 45	23	770 00	33 48	24	780 00	32 50
Sailors:									
Foreign	355	4,071 18	11 47	326	4,870 00	14 94	229	3,845 00	16 79
Coastwise	96	1,873 58	19 51	44	956 00	21 73	96	1,618 00	16 80
Stewards	22	970 50	44 11	21	923 50	43 98	20	901 00	45 05
Stewardesses	10	195 00	19 50	9	160 00	17 78	9	158 00	17 55
Sailmakers				1	25 00	25 00	1	18 00	18 00
Storekeepers	2	80 00	40 00				1	40 00	40 00
Water-tenders	6	300 00	50 00	6	300 00	50 00	3	150 00	50 00
Waiters	63	1,275 00	20 24	54	1,090 00	20 19	50	1,060 00	21 20

PORT OF SAN FRANCISCO, CAL.

OFFICE OF THE UNITED STATES SHIPPING COMMISSIONER,
603 *Front Street, San Francisco, June* 30, 1886.

SIR: In answer to the interrogatories contained in your communication under date of May 7, 1886, I beg to inclose herewith the following replies, viz:

FIRST ANSWER.

Number of vessels shipped	346
Number of officers shipped	1,112
Number of seamen shipped	6,533
Number of firemen shipped	967
Total number of men shipped	8,612
Number of natives engaged	2,581
Number of foreigners engaged	6,021

SECOND ANSWER.

Number of vessels	336
Number of men	4,477

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THIRD ANSWER.

Number of vessels	10
Number of men	120

FOURTH ANSWER.

Number of crews paid off	9
Number of men paid off	201

FIFTH ANSWER.

Number of crews discharged	353
Number of men discharged	8,222

SIXTH ANSWER.

Steamers	3.46
Ships	1.22
Barks	2.95
Brigs	3.18
Schooners	3.31

SEVENTH ANSWER.

Average amount of monthly wages per man.

Class of vessel.	1885.						1886.					
	July.	August.	September.	October.	November.	December.	January.	February.	March.	April.	May.	June.
FOREIGN.												
Steamers	$42 66½	$42 60½	$44 39½	$42 70	$45 46½	$47 44	$42 16	$45 89½	$46 82	$44 18½	$45 14	$43 38
Ships	.....	13 12½	12 46	19 37	20 00	18 48	22 53	17 69	17 98	15 84	15 97	16 91
Barks and barkentines	31 98	29 74	26 25	23 04	24 89	24 69	26 78	26 90	32 15	33 05	33 03	41 12
Brigs and brigantines	32 35	30 86	28 52	27 89	27 71	28 06	26 71	28 89	33 72	34 47	32 21	33 32
Schooners	34 37½	37 87½	28 66½	25 38	26 97	28 72	29 61	29 19½	36 00	35 71	35 00	35 45
COASTING.												
Steamers	47 85	.....	47 85	.....	.....	.....	.....	.....	47 67	.....	49 28½	.....
Ships	.....	.....	.....	.....	20 00	.....	.....	.....	.....	.....	.....	.....
Barks and barkentines	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Brigs and brigantines	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Schooners	.....	.....	.....	.....	32 14	.....	.....	.....	42 14	.....	.....	.....

EIGHTH ANSWER.

My observations regarding the operations of the law prohibiting the payment of advanced wages at this port during the year have been such as to convince me of the need of a change in said law.

NINTH ANSWER.

Owing to the fact that this is my first year in this office I cannot answer this question as fully as it should be however; from what I can glean from those experienced in the premises, I am of opinion that neither the habits nor condition of seaman at this port have been improved consequent upon the operations of said advance law.

TENTH ANSWER.

As far as my knowledge or information extends, no perceptible change in the treatment of seamen at sailor boarding-houses or in the conduct of the landlords have taken place from the efforts of the law.

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ELEVENTH ANSWER.

I believe a system of examination for officers of the merchant service would prove beneficial to all concerned, and tend greatly to improve the service of navigation.

TWELFTH ANSWER.

I am of opinion that a system of apprenticeship for the young men of the country who desire to follow navigation would be highly beneficial to them and to the merchant marine service. No applications to apprentice young men in the navigation service have been made at this office during my term.

THIRTEENTH ANSWER.

The general health of seamen arriving at this port has been very good.

FOURTEENTH ANSWER.

Complaints as to food or water have been very few, and none have been lodged with me for investigation or decision. Insubordination on board ship has been, as far as I know, of rare occurrence, and those that have occurred were taken to the United States courts for investigation and settlement. A few cases of abuse of seamen have come to my knowledge; they were, however, taken to the United States courts for settlement.

Very respectfully,

E. HACKETT,
Shipping Commissioner.

Hon. JARVIS PATTEN,
Commissioner of Navigation, Washington, D. C.

PORT OF PHILADELPHIA.

UNITED STATES SHIPPING COMMISSIONER'S OFFICE,
No. 207 Walnut Street, Philadelphia, August 13, 1886.

SIR: I have the honor to transmit herewith my answers to interrogatories of May 7, 1886.

Very respectfully, your obedient servant,

JAMES A. O'BRIEN,
Ex-Shipping Commissioner.

One inclosure.

Hon. JARVIS PATTEN,
Commissioner of Navigation, Washington, D. C.

Answers to interrogatories as follows for year ending June 30, 1886.

FIRST.

Number of vessels for which crews have been engaged during the year, 691; number of men shipped, classed as officers, 385; men, 2,678, and firemen, 78. About one-fifth of the total number of men shipped were native Americans and four-fifths of foreign birth.

SECOND.

Number of vessels bound on foreign voyages required to pay the statutory fees for which crews were engaged, 60.

Number of men shipped on vessels foreign bound required to pay the statutory fees, classed as officers, 212; men, 590; firemen, 58.

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THIRD.

Number of vessels bound to the West Indies for which crews have been engaged, 148.
Number of vessels bound coastwise for which crews have been engaged, 483.
Number of men shipped in vessels bound to the West Indies, classed as officers, 37; men, 591; firemen, 20.
Number of men shipped in vessels bound coastwise, classed as officers, 136; men, 1,497; firemen, none.

FOURTH.

Number of vessels paid off from coastwise voyage, 107.
Number of men paid off from coastwise voyage classed as officers, 29; men, 293.

FIFTH.

Number of vessels from foreign voyages other than from West Indies, paid off, 84.
Number of crews from West India voyages, paid off, 226.
Number of men from foreign voyages other than West Indies, paid off, classed as officers, 438; men, 846; firemen, 177.
Number of men paid off from West India voyages, classed as officers, 312; men, 958; firemen, 97.

SIXTH.

Class.	Tons.	Men.	Per 100 tons.
Ships	1,800	25	1½
Barks	900	15	1⅔
Schooners	900	10	1⅛
Schooners	500	7	1⅖
Schooners	300	5	1⅔

SEVENTH.

Month.	Coastwise.	West Indies.	Long voyages.
1885.			
July	$20 00	$20 00	$18 00
August	20 00	20 00	18 00
September	20 00	20 00	18 00
October	20 00	20 00	18 00
November	20 00	20 00	18 00
December	18 00	18 00	15 00
1886.			
January	15 00	15 00	15 00
February	15 00	15 00	15 00
March	20 00	20 00	18 00
April	20 00	20 00	18 00
May	20 00	20 00	18 00
June	20 00	20 00	18 00

EIGHTH.

The law prohibiting the payment of advance wages is a failure, and should be repealed as soon as possible. It is evaded in many ways, sometimes to the detriment of the sailor, and often against the ship.

NINTH.

I see no change in the condition and habits of seamen during the past year.

TENTH.

Seamen who sail in coasting vessels, as a rule, don't patronize regular sailors' boarding-houses, and, while I have heard no complaints, I don't see any improvements.

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ELEVENTH.

I believe the examination and certification of officers by the Government would improve the service and safety of navigation.

TWELFTH.

I believe a regularly organized system of apprentices would tend to increase the efficiency of the merchant marine, and I think the British plan of placing school-ships in the large ports, at Government expense, would be the best plan, as a boy could learn everything on a school-ship, while on the other hand we have very few large American ships, and small vessels don't want boys, particularly those who have not been to sea, and I notice our ship-owners are not building square-rigged vessels now, as they can sail schooners much cheaper.

An apprentice would not have an opportunity of learning to be a first-class seaman on board of a schooner, and it would be advisable for the Government to furnish the ship for the purpose.

THIRTEENTH.

The general health of seamen arriving at this port is good.

FOURTEENTH.

No complaints.

PORT OF BALTIMORE.

BALTIMORE, *July* 1, 1886.

DEAR SIR: I have the honor to furnish the following answers to interrogatories propounded by the Department in letter of instructions of May 7, 1886.

FIRST.

Number of vessels for which crews were engaged	94
Number of officers shipped	166
Number of seamen shipped	712

The proportion of native and foreign-born persons engaged, 1.27 foreign to 1 native.

SECOND.

Number of vessels bound on foreign voyages	94
Number of men bound on foreign voyages required to pay statutory fees	787
Number of men reshipped without the payment of statutory fees	92

THIRD.

No shipments of seamen on any other voyage.

FOURTH.

Number of crews paid off, coastwise	20
Number of men paid off, coastwise	57

Which embraces only parts of crews, as it is rarely an entire crew is paid off from coastwise vessels.

FIFTH.

Number of crews discharged from foreign voyages	74
Number of men discharged from foreign voyages	619

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SIXTH.

Average number of men (all told) to 100 tons register in vessels of different size, and in what capacities:

Class of vessels.	Tonnage.	Capacities.						Average number of men to one hundred tons register, all told.
		First mate.	Second mate.	Carpenter.	Steward.	Cook.	Seamen.	
Ship	2,180.21	1	1	1	1	1	22	1.27
Ship	1,436.43	1	1	1	1	1	15	1.39
Ship	1,731.62	1	1	1	1	1	18	1.33
Ship	1,215.10	1	1	1	1	1	12	1.40
Ship	1,092.46	1	1	1	1	1	14	1.74
Bark	549.54	1	1	.....	.....	1	8	2.00
Bark	418.06	1	1	.....	.....	1	7	2.39
Bark	616.90	1	1	.....	.....	1	8	1.78
Bark	442.40	1	1	.....	.....	1	6	2.03
Bark	492.93	1	1	.....	.....	1	6	1.83
Bark	489.60	1	1	.....	.....	1	6	1.84
Bark	474.25	1	1	.....	.....	1	7	2.11
Bark	675.36	1	1	.....	.....	1	8	1.63
Brig	399.76	1	1	.....	.....	1	4	1.75
Brig	311.95	1	1	.....	.....	1	4	2.25
Brig	227.47	1	1	.....	.....	1	4	3.09
Brig	458.28	1	1	.....	.....	1	5	1.75
Brig	362.48	1	1	.....	.....	1	4	1.93
Brig	295.32	1	1	.....	.....	1	4	2.40
Schooner	654.01	1	1	.....	.....	1	4	1.07
Schooner	480.89	1	1	.....	.....	1	4	1.46
Schooner	119.28	1	.....	.....	.....	1	4	5.04
Schooner	360.17	1	1	.....	.....	1	4	1.94
Schooner	281.41	1	.....	.....	.....	1	4	2.13
Schooner	513.30	1	1	.....	.....	1	4	1.36

SEVENTH.

The average wages of crews shipped through this office, $17 per month, both foreign and coastwise.

EIGHTH.

The operations of the law prohibiting the payment of advances for the past year have been generally satisfactory so far as the same have come under my observation.

NINTH.

The condition and habits of seamen, so far as my observations extends, certainly tends much toward improvement.

TENTH.

I have observed no material change in the treatment of seamen by the boarding-house keepers. At this port seamen are generally well treated, and the boarding-house keepers are, on the whole, a very fair class of persons.

ELEVENTH.

The examination and certification of officers by the Government would be a great improvement, and would certainly have a tendency to the improvement of the service, the elevation of officers, and the safety of navigation.

TWELFTH.

I can see no reason why I should change my views, as contained in my report of last year, that there should be a regular organized system of apprentices; that it

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would tend to increase the efficiency of the merchant marine, and that all vessels should be required to carry apprentices according to tonnage.

THIRTEENTH.

The general health of seamen arriving at this port is very good.

FOURTEENTH.

No cases of insubordination or abuse of men at sea, or complaints by seamen of any nature whatever, have been reported to this office, or have any come within my knowledge.

Very respectfully submitted.

JOHN J. ROGERS,
Shipping Commissioner.

Hon. JARVIS PATTEN,
Commissioner of Navigation, Treasury Department, Washington, D. C.

PORT OF BOSTON.

OFFICE OF THE UNITED STATES SHIPPING COMMISSIONER,
DISTRICT OF BOSTON AND CHARLESTOWN,
No. 1 Commercial Wharf, Boston, July 8, 1886.

SIR: Inclosed you will please find statement and answers to interrogatories propounded by your Department and forwarded to this office.

Very respectfully, your obedient servant,

JOHN BABSON,
Shipping Commissioner.

One inclosure.

JARVIS PATTEN, Esq.,
Commissioner, Bureau of Navigation, Treasury Department,
Washington, D. C.

DISTRICT OF BOSTON AND CHARLESTOWN,
July 8, 1886.

FIRST.

Number of vessels for which we have engaged crews during the year ending June 30, 1886	745
Number of officers shipped during the year	470
Number of seamen shipped during the year	2,416
Number of firemen	8
Proportion of native born (per cent.)	15
Proportion of foreign born (per cent.)	85

SECOND.

Number of vessels bound on foreign voyages	154
Number of seamen shipped on foreign voyages and required to pay the statutory fee	1,195
Number of officers shipped on foreign voyages and required to pay the statutory fee	243

THIRD.

Number of vessels bound on other voyages	154
Number of seamen shipped on other voyages	1,221
Number of officers shipped on other voyages	140

FOURTH.

Number of crews discharged from coasting voyages	77
Number of men discharged from coasting voyages	369

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FIFTH.

Number of crews discharged from foreign voyages..... 168
Number of men discharged from foreign voyages..... 1,614

SIXTH.

The average number of men, all told, to 100 tons register would be, in a vessel of 1,000 tons, 8 able seamen, 2 ordinary, 1 cook, 1 steward, 2 mates, and 1 carpenter.

SEVENTH.

The following are the average wages of crews shipped each month on foreign voyages:

Months.	Wages.	Months.	Wages.
July	$18	January	$15
August	20	February	15
September	16	March	18
October	15	April	18
November	15	May	18
December	15	June	18

The following are the average wages of crews shipped each month on coasting voyages:

Months.	Wages.	Months.	Wages.
July	$20	January	$18
August	20	February	15
September	20	March	20
October	18	April	20
November	15	May	20
December	15	June	20

EIGHTH.

My observations as to the operations of the law prohibiting the payment of advance wages to seamen are, that the law has been observed in this port in nearly every case. Masters and owners, with some few exceptions, have obtained their crews at this office without the payment of any money.

NINTH.

The habits and condition of the seamen at this port, I think, have improved. Seamen are rendered on board ship without so much trouble and in a sober manner.

TENTH.

I don't think the treatment of seamen at the sailors' boarding-houses has been improved, or the conduct of the landlords changed in any respect.

ELEVENTH.

I think the examination and certification of officers by the Government on a plan similar to the British would be of great service to vessels, and tend wonderfully to improve the efficiency of officers, and also tend to greater safety of navigation.

TWELFTH.

I think a regular organized system of apprentices would tend to increase the efficiency of the merchant service, and would urge upon Congress the speedy adoption of such a system.

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THIRTEENTH.

The general health of seamen arriving at this port during the past year has been good.

FOURTEENTH.

There has been but one complaint of insubordination on board ship that has come to my knowledge, and only one complaint by seamen as to food or water during the voyage, and in that case the master was fined.

JOHN BABSON,
United States Shipping Commissioner.

PORT OF NEW ORLEANS.

UNITED STATES SHIPPING COMMISSIONER'S OFFICE,
New Orleans, June 30, 1886.

SIR: I herewith respectfully submit the following answers to interrogatories from the Bureau of Navigation of May 7, 1886:

FIRST.

Rigs.	No.	Officers.	Firemen.	Stokers.	Others.
Steamships*	9	27	27	18	144
Ships	11	33	.....	.....	132
Bark	1	2	.....	.....	9
Schooners	18	36	.....	.....	74
Tug-boat	1	2	1	1	2
Total	40	101	28	19	361

* The nine steamships made ninety-four trips during the fiscal year ending June 30, 1886.

Of the entire number I find—

	Per cent.
Native born	9
Naturalized citizens	36
Foreigners of various nationalities	55
	100

SECOND.

To the second interrogatory I would state that the number of vessels and men bound on foreign voyages and required to pay the statutory fees—forty vessels and eight hundred and forty-one men who paid the required fee.

THIRD.

Included as above.

FOURTH.

None.

FIFTH.

Nine steamships, aggregating	3,099.13
Seven ships, aggregating	8,553.44
Thirteen schooners, aggregating	1,097.64
Three barks, aggregating	1,945.74

With a total of five hundred and forty-five seamen, who received final discharge and paid statutory fees.

SIXTH.

After a very careful and minute calculation, I have concluded that the "Tables" average number of men, all told, to 100 tons register, prepared by James C. Reed, of

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New York, is eminently correct, and can safely be adopted by the Bureau of Navigation. Said report will be found on pages 268 and 269, Report of the Commissioner of Navigation for 1885.

SEVENTH.

Wages will average per month as follows:

Months.	Coast-wise.	West Indies.	Long voyages.	Months.	Coast-wise.	West Indies.	Long voyages.
1883.				1886.			
July	$20	$18	$18	January	$15	$15	$18
August	20	18	18	February	15	15	18
September	20	18	18	March	15	15	18
October	20	18	18	April	20	20	18
November	20	18	18	May	20	20	15
December	20	18	18	June	20	20	15

Fruiters are paying $25 per month to able seamen.

EIGHTH.

My observation relative to this interrogatory shows clearly that the law prohibiting the payment of advances has worked to the disadvantage of ships, but to the great advantage of seamen.

NINTH.

The condition and habits of seamen in this port remain about the same; the operation of the law has had little apparent effect.

TENTH.

All the larger boarding-house keepers have gone out of the business, throwing the sailor into the smaller ones, where no change is perceptible.

ELEVENTH.

I am well satisfied that a proper certification and classification of officers should be adopted. It would tend to improve the service and insure safety to navigation.

TWELFTH.

A regular system of apprenticeship would undoubtedly materially benefit the merchant service and prepare American boys for command. I am further fully convinced that the immediate requirements of our mercantile marine demand that there shall be, in all our deep-water ports, school ships, the object of which shall be the education of American boys, who will be trained and fitted for a seafaring life; with this accomplished, it would be but a short time when the United States would have a hardy set of sailors. I have constant applications for disposing of boys, who, no doubt, would become useful members of the mercantile marine if educated for that purpose.

THIRTEENTH.

The general health of seamen arriving at this port (with the exception of those from the immediate neighborhood of Aspinwall, who invariably contract the worst cases of malaria) is good.

FOURTEENTH.

No complaints of insubordination on board of American ships have been brought to my attention during the fiscal year, and no complaints by seamen as to food or water during their service on the United States merchant vessels.

Respectfully submitted.

WILLIAM WRIGHT,
United States Shipping Commissioner, Port of New Orleans.

Hon. JARVIS PATTEN,
Commissioner of Navigation, Washington, D. C.

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PORT OF CHARLESTON.

CHARLESTON, S. C., *June* 30, 1886.

SIR: I have the honor to transmit herewith answers to your interrogatories under Bureau instructions of May 7 last.

FIRST.

Number of vessels for which crews or parts thereof have been engaged at this office, for the fiscal year were—

Vessels	28
Men shipped	54
Officers	4
Seamen	50
Native born	18
Foreign born	36
Number reshipped (no fees collected)	19

SECOND.

Number of vessels bound on foreign voyages	7
Number of men shipped for foreign voyages required to pay statutory fees	27

THIRD.

Number of vessels bound on other voyages	21
Number of men shipped on other voyages	27

FOURTH.

Number of crews and parts thereof paid off from coastwise voyages	9
Vessels	16

FIFTH.

Number of crews and men, all told, discharged from foreign voyages	1
Crew	7

SIXTH.

The average number of men, all told, to the 100 tons register, shipped at this office, were 2½ able seamen.

SEVENTH.

The average wages of crews shipped each month were as follows on coastwise vessels and foreign voyages, respectively:

Month.	Coastwise.	Foreign.	Month.	Coastwise.	Foreign.
July	$20 00	(*)	January	$20 00	(*)
August	20 00	(*)	February	20 00	(*)
September	20 00	$18 00	March	(*)	(*)
October	20 00	15 00	April	18 00	$18 00
November	20 00	16 00	May	18 00	(*)
December	20 00	(*)	June	(*)	(*)

* None shipped.

EIGHTH.

My observations as to the operation of the law prohibiting the payment of advance wages at this port during the fiscal year: I must say for the past year I can observe a great change for the better. Sailors avoid the sailor boarding-houses, and when on

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shore go to private houses. I notice many seamen take rooms and get their meals at restaurants, thereby avoid boarding-house masters and runners, and seek ships for themselves.

NINTH.

My observation leads me to the conclusion that the conditions and habits of seamen are very much improved in consequence of said law, as they are thrown more upon their own resources and are more provident.

TENTH.

The effect of the law upon sailor boarding-houses at this port has been to close all such houses excepting the home and one or two others.

ELEVENTH.

My views in regard to the examination of officers by the Government: I believe it would be a most excellent law, and would tend to greatly improve navigation, and prevent many losses in the merchant marine service.

TWELFTH.

My views to the apprentice system are, as I stated in my last annual report, very favorable to the apprentice system. It would tend to greatly increase the efficiency of the merchant marine service.

THIRTEENTH.

The general health of seamen at this port will, I think, compare very favorably with any other port in the United States, namely:

Number of seamen discharged with permits for hospital	5
Lame hand	1
Fever (with other diseases contracted by their own imprudence)	3

FOURTEENTH.

I have no cases of insubordination to report. Have on several other occasions had complaints from masters of vessels in the coasting service as to the incompetency of their crews; but as section 4612, Revised Statutes, which gave a commissioner authority to investigate such cases, was repealed June 9, 1874, therefore I have declined to hear such cases.

I very respectfully submit the above report for the fiscal year ending ending June 30, 1886.

Your obedient servant,

G. B. STODDARD,
United States Shipping Commissioner Port of Charleston, S. C.

Hon. JARVIS PATTEN,
Commissioner of Navigation, Washington, D. C.

PORT OF SAVANNAH.

SAVANNAH, GA., *June* 30, 1886.

Report of Isaac Beckett, United States shipping commissioner, port of Savannah, Ga., for the year ending June 30, 1886, *in compliance with Department letter dated May* 7, 1886.

FIRST.

Number of vessels for which crews were engaged	5
Number of men shipped, officers	10
Number of men shipped, seamen	27
Total	37

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Number of officers, native born	6
Number of officers, foreign born	4
Total	10
Number of seamen, native born	6
Number of seamen, foreign born	21
Total	27

SECOND.

Number of vessels, foreign voyages, paid statutory fee	5
Number of men, foreign voyages, paid statutory fee	37

THIRD.

No vessels or men on other than foreign voyages.

FOURTH.

No crew or men paid off from coastwise voyages.

FIFTH.

No crews or men paid off from foreign voyages.

SIXTH.

The actual number of officers and men shipped at this port during this year is as follows:

Number of vessels.	Tons.	Officers.	Seamen.
1	365	2	4
1	391	2	5
1	443	2	6
1	503	2	6
1	641	2	6

SEVENTH.

Average wages per month of crew on foreign voyages:

July, 1885	$20 00
November, 1885	16 00
June, 1886	18 00

EIGHTH AND NINTH.

My observations as to the operations of the law prohibiting the payment of advance wages assure me of an improvement over the preceding year. The contracts made during the past year usually set out the facts and tended to that extent, at least, to elevate the character of the seamen. Having discharged no seamen during the year I have had no opportunity to judge of the effect of the law upon that class, but I assume that it is salutary.

TENTH.

I am decidedly of the opinion that there has been a material improvement. The seamen have been practically untrammeled in shipping, and landlords who are disposed to take advantage of them are greatly restricted by the law prohibiting the payment of advance wages. Whatever arrangement is privately entered into between masters of vessels and landlords as to the payment of the seamen's indebtedness, is made under the restraint imposed by a realization of the fact that these disbursements will be carefully scrutinized at the time of discharge, hence great care is exercised in the examination of the accounts of the seamen, and excessive and improper charges are guarded against.

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ELEVENTH.

My reply to this interrogatory is an emphatic affirmative. Any system which tends to establish a standard of efficiency among officers of the merchant marine must, of necessity, be productive of good results. There is an inducement offered to attain to exalted proficiency, which stimulates ambition.

TWELFTH.

The reply to a similar interrogatory propounded last year in my former report embodies my present views. I am fully convinced that a well regulated system of apprenticeship would be conducive to an increased efficiency among our seamen, and in time relieve us from the thraldom imposed by the present system.

THIRTEENTH.

My reply to this interrogatory is given in the language of the surgeon of the Marine Hospital Service at this port, who, in response to my request for information on the subject, addressed the following:

"My observation leads me to believe that the general health of seamen arriving at this port is slightly better than at the majority of the ports of this country, as is attested by the short duration of hospital treatment required. I have had a few cases of scurvy, but was able to trace each distinctly to foreign voyages on foreign vessels." I respectfully refer to the last paragraph of the above, as pregnant with comparison between the food supply of American and foreign vessels.

FOURTEENTH.

I have no knowledge, official or otherwise, of any case of insubordination on board ship or abuse of men at sea, nor have I been the recipient of any complaint by seamen as to food, water, or service during the past year.

Respectfully submitted.

ISAAC BECKETT,
United States Shipping Commissioner.

PORT OF MOBILE.

UNITED STATES SHIPPING COMMISSIONER'S OFFICE,
Mobile, July 1, 1886.

SIR: I respectfully submit the following tables exhibiting replies to interrogatories first, second, third, fourth, fifth, sixth, and seventh:

Shipments and discharge of seamen.

SHIPMENTS.

Months.	Voyages, coasting. (West Indies, Mexico, and British Provinces.)								Voyages, foreign.							
	Vessels.	Seamen.	Officers.	Shipped.	Native born.	Foreign born.	Monthly wages.	Discharged.	Vessels.	Seamen.	Officers.	Shipped.	Native born.	Foreign born.	Monthly wages.	Discharged.
1885.																
July	2	6	1	7	4	3	$18	....	....	....	....	....	....	....	....	....
August	2	8	1	9	3	6	18	....	1	7	2	9	4	5	$18	....
September	1	4	1	5	3	2	18	....	....	....	....	....	....	....	....	....
October	....	....	....	....	....	....	....	....	1	5	1	6	2	4	18	....
November	1	4	....	4	1	3	20	....	....	....	....	....	....	....	....	....
December	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
1886.																
January	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
February	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
March	2	8	2	10	5	5	20	....	1	9	2	11	2	9	20	....
April	3	15	3	18	6	12	20	....	....	....	....	....	....	....	....	....
May	2	8	2	10	4	6	20	....	....	....	....	....	....	....	....	....
June	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Total	13	53	10	63	26	37	.....	....	3	21	5	26	8	18	.....	....

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Shipments and discharge of seamen—Continued.

DISCHARGES.

Months.	Voyages, coasting. (West Indies, Mexico, and British Provinces.)								Voyages, foreign.							
	Vessels.	Seamen.	Officers.	Shipped.	Native born.	Foreign born.	Monthly wages.	Discharged.	Vessels.	Seamen.	Officers.	Shipped.	Native born.	Foreign born.	Monthly wages.	Discharged.
1885.																
July	2	8	3	....	....	....	.....	11	2	8	2	....	....	....	.....	10
August	....	....	....	....	....	....	.....	....	3	4	1	....	....	....	.....	5
September	....	....	....	....	....	....	.....	....	2	7	4	....	....	....	.....	11
October	....	....	....	....	....	....	.....	....	3	9	5	....	....	....	.....	14
November	3	9	....	....	....	....	.....	9	3	12	5	....	....	....	.....	17
December	....	....	....	....	....	....	.....	....	....	....	....	....	....	....	.....	....
1886.																
January	2	2	....	....	....	....	.....	2	1	3	2	....	....	....	.....	5
February	....	....	....	....	....	....	.....	....	4	17	3	....	....	....	.....	20
March	....	....	....	....	....	....	.....	....	2	9	3	....	....	....	.....	13
April	1	4	....	....	....	....	.....	4	3	10	6	....	....	....	.....	16
May	....	....	....	....	....	....	.....	....	4	17	5	....	....	....	.....	22
June	....	....	....	....	....	....	.....	....	1	4	1	....	....	....	.....	5
Total	8	23	3	....	....	....	.....	26	28	100	37	....	....	....	.....	157

SIXTH.

Crew for vessels of 100 *tons and upwards.*

Tonnage.	Officers.	Carpenters.	Stewards.	Cooks.	Men.	Ordinaries.	Boys.	Full crew.	Tonnage.	Officers.	Carpenters.	Stewards.	Cooks.	Men.	Ordinaries.	Boys.	Full crew.
100 tons	1	....	....	1	2	1	....	5	1,100 tons	2	1	1	1	9	2	....	16
200 tons	1	....	....	1	3	1	....	6	1,200 tons	2	1	1	1	10	2	....	17
300 tons	1	....	....	1	4	....	....	6	1,300 tons	3	1	1	1	12	....	....	18
400 tons	2	....	....	1	3	1	....	7	1,400 tons	3	1	1	1	12	2	....	20
500 tons	2	....	....	1	4	1	....	8	1,500 tons	3	1	1	1	14	2	....	22
600 tons	2	....	....	1	6	....	....	9	1,600 tons	3	1	1	1	16	2	....	24
700 tons	2	....	....	1	5	2	....	10	1,700 tons	4	1	1	1	16	2	....	25
800 tons	2	....	....	1	7	....	1	11	1,800 tons	4	1	1	1	18	....	2	27
900 tons	2	1	....	1	6	2	1	13	1,900 tons	4	1	1	1	19	2	1	29
1,000 tons	2	1	1	1	8	2	....	15	2,000 tons	4	1	1	1	18	4	2	31

EIGHTH.

The non-advance law does not work well, for the following reasons:

1st. It discriminates against American vessels shipping their crews before a shipping commissioner who conscientiously tries to enforce the law; inasmuch as it induces boarding-house masters to give the preference to foreign vessels when men are scarce, because advances are made by such vessels without fear of detection.

2d. Boarding-house masters now demand their money upon the delivery of the men on board the vessel, instead of three days after departure of vessel, thus affording inducements for the men to desert before sailing, and be shipped over again for another advance. When the supply is greater than the demand sailors are frequently refused shelter, and are thus forced to become tramps.

NINTH.

From the answer to the eighth question, it follows necessarily, that the habits and condition of the sailor is not improved by the enforcement of said law.

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TENTH.

There is no change for the better in the treatment of sailors, except that it may render the boarding-house master more cautious in supplying the sailor with extra quantities of rum and tobacco, and such other articles as are not absolutely necessary for his comfort, and are deleterious to his health.

ELEVENTH.

The adoption of the examination of mariners by competent officers of the Government, and certification of the inability, similar to the British plan, would undoubtedly tend to the improvement of the service and safety of navigation, because it would supply the service with competent, educated, and skilled sailors in lieu of ordinary seamen.

TWELFTH.

If all vessels were required to carry one or more apprentices, a large number of expert seamen would soon be produced without extra expense or trouble to the officers and owners of American vessels, and would thus prove available in an emergency.

THIRTEENTH.

The general health of seamen arriving and sojourning at this port for the year ending June 30, 1886, has been good.

FOURTEENTH.

No complaints have been made at this office during this fiscal year of acts of insubordination or bad treatment, or shortness of food or water, by either the officers or seamen of any of the vessels arriving at this port.

Very respectfully,

PAUL RAVESIES,
United States Shipping Commissioner.

Hon. JARVIS PATTEN,
Commissioner of Navigation, Washington, D. C.

PORT OF BATH.

UNITED STATES SHIPPING COMMISSIONER'S OFFICE,
Bath, Me., June 30, 1886.

SIR: Answers to interrogatories submitted by the Bureau of Navigation, Washington, D. C.:

FIRST.

Total number of vessels shipped for during the year ending June 30, 1886.....		113
Total number of men shipped		266
Number shipped as mates	14	
Number shipped as second mates	11	
Number shipped as cooks.....	14	
Number shipped as engineer.....	1	
Number shipped as seamen.....	226	
		266

Two-thirds of the men as above were foreigners and one-third American.

SECOND.

Number of vessels shipped for foreign	1
Number of men shipped for foreign	1

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THIRD.

Number of vessels bound coasting	112
Number of men shipped coasting	265

FOURTH.

Number of men paid off, coastwise	24
Amount paid to seamen discharged, coastwise	$543

FIFTH.

Number of men paid off, foreign voyages	16
Amount paid to seamen discharged, foreign	$418 14

SIXTH.

I usually ship one man for every 100 tons.

SEVENTH.

Average wages at this port for seamen for the months of—

July, August, and September, 1885	$22 00
October, November, and December, 1885	20 00
January, February, and March, 1886	18 00
April, May, and June, 1886	22 00

EIGHTH.

I have not seen or heard of any advances as being paid at this port during the last year.

NINTH.

I cannot see any particular change in the habits of seamen during the past year.

TENTH.

In answer to this question I would say, I have hardly shipped a seaman from a boarding-house within the past year, consequently I have had scarcely anything to do with boarding-house masters or landlords.

ELEVENTH.

My views in this matter are precisely the same as one year ago, that such examinations would tend toward obtaining better men for the navigation of our merchant marine.

TWELFTH.

I think a system of making apprentices would tend very much to man our merchant marine with American seamen, where it is now manned two-thirds by foreigners.

THIRTEENTH.

The health of the seamen of this port during the past year has been exceptionally good; not more than one or two cases of sickness have been reported, and those of a mild form.

FOURTEENTH.

I have not heard of any cases of insubordination or of any ill treatment on shipboard, or complaints in regard to food and water for the past year.

Very respectfully,

EUGENE O. SMITH,
United States Shipping Commissioner, Bath, Me.

Hon. JARVIS PATTEN,
Commissioner of Navigation, Treasury Department.

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PORT OF PROVIDENCE.

OFFICE OF THE UNITED STATES SHIPPING COMMISSIONER,
Providence, R. I., July 1, 1886.

SIR: In answer to the interrogatories contained in your communication of May 7, 1886, I respectfully submit the following answers:

For first, second, third, fourth, fifth, and seventh answers, please see inclosed table:

SIXTH.

Average crew of schooners to tonnage.	Mates.	Engineer.	Cooks.	Seamen.
200 tons	1		1	2
300 tons	1		1	3
400 tons	2		1	4
500 tons	2		1	5
600 to 900 tons, with steam-power	2	1	1	4

EIGHTH.

My observation as to the operation of the law prohibiting advance wages at this port is that it has been of no practical benefit to owners, masters, or seamen, as vessels have often been detained owing to the scarcity of seamen caused by the boarding masters refusing to take men without they paying their board in advance; therefore, it has been impossible to keep a sufficient number of seamen here; many have gone into other employments, and others to the large cities where they can ship on foreign vessels. Many masters have expressed their opinion that the prohibiting of advance wages has caused the scarcity of men, and every seaman has disapproved of the law as it now is.

NINTH.

The condition and habits of seamen, as far as my observation goes, have not improved, and the law has not made them any more provident of their earnings.

TENTH.

The law has had no effect in the treatment of seamen in the boarding-houses at this port. The landlords are very humane in their treatment of seamen.

ELEVENTH.

As there is no foreign trade from this port I cannot answer from practical experience. I think it would tend to the improvement of crews and be a benefit to navigation.

TWELFTH.

I think the apprenticeship of boys would tend to increase the efficiency of the merchant marine.

THIRTEENTH.

The general health of seamen arriving at this port the past year has been very good.

FOURTEENTH.

There have been no complaints of insubordination or abuse of men at sea, or any complaint by seamen as to food, or water, or treatment.

Very respectfully,

BENJ. L. NICHOLS,
United States Shipping Commissioner.

Hon. JARVIS PATTEN,
Commissioner of Navigation, Washington, D. C.

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Report of engagements for the year ending June 30, 1886.

Date.	Number.		Number.		Number.		Vessels.		Officers.		Seamen.		Wages.	
	Vessels.	Men.	Officers.	Seamen.	Native born.	Foreign born.	Foreign.	Coastwise.	Foreign.	Coastwise.	Foreign.	Coastwise.	Foreign.	Coastwise.
1885.														
July	35	100	17	83	56	44	0	35	0	17	0	83	.....	$20 00
August	39	119	8	111	62	57	0	39	0	8	0	111	....	20 00
September	30	99	12	87	44	55	0	30	0	12	0	87	.....	20 00
October	25	76	5	71	43	33	0	25	0	5	0	71	.....	20 00
November	30	81	2	79	32	49	0	30	0	2	0	79	.....	20 00
December	46	130	5	125	57	73	0	46	0	5	0	125	.....	18 00
1886.														
January	20	78	11	67	36	42	1	19	2	9	5	62	$16 00	18 00
February	18	68	15	53	40	28	1	17	1	14	4	49	16 00	18 00
March	38	111	9	102	45	66	0	38	0	9	0	102	.....	20 00
April	20	61	2	59	19	43	0	20	0	2	0	59	.....	22 00
May	27	90	5	85	40	50	0	27	0	5	0	85	.....	20 00
June	21	61	5	56	31	30	1	20	0	5	2	54	20 00	20 00
Total	349	1,074	96	978	505	569	3	346	3	93	11	967	.....	.....

Report of discharges for the year ending June 30, 1886.

Date.	Discharged from foreign voyages.		Discharged from coastwise voyages.		Paid off from coastwise voyages without fees.	
	Number of crews.	Number of men.	Number of crews.	Number of men.	Number of crews.	Number of men.
1885.						
July	0	0	5	12	2	6
August	0	0	3	16	4	17
September	0	0	4	13	6	33
October	1	9	3	6	4	15
November	0	0	2	9	6	25
December	0	0	3	5	1	5
1886.						
January	0	0	1	5	1	5
February	0	0	3	12	3	14
March	0	0	2	9	2	15
April	0	0	1	4	1	4
May	0	0	2	10	5	22
June	1	4	1	4	5	21
Total	2	13	30	105	42	86

PORT OF NEW BEDFORD.

NEW BEDFORD, MASS., *June 30, 1886.*

SIR: I have the honor to submit the following answers to interrogatories:

FIRST.

Total number of vessels for which I have engaged crews for the year ending June 30, 1886, 18 vessels, and the number of men shipped for said vessels, 171 men. Twelve of these vessels were bound on foreign voyages, and shipped 133 men. One of these vessels was bound to California, and shipped 17 men; the other 5 vessels were bound coastwise, and shipped 21 men. I shipped 22 officers for the 13 vessels, 14 native born and 8 foreign born. Of the remaining 149 men the proportion would be four-fifths foreign born and one-fifth native born.

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SECOND.

Twelve of vessels bound on foreign voyages, and shipped 133 men; one vessel bound to California shipped 17 men. The statutory fee of $2 for each man was paid for 94 men that shipped on these vessels. Fifty-six men were reshipped in the same ship for another voyage, for which no fees were paid. The number of men shipped bound on foreign voyages were 133. Seventeen men were shipped bound coastwise to the Pacific (California), and 21 men were shipped bound coastwise to Atlantic ports, for which a fee of $1 was paid for each man.* This is not a statutory fee.

THIRD.

Six vessels were shipped bound on coastwise voyages. Thirty-eight men were shipped for the same, as follows: Five vessels were bound coastwise (Atlantic ports), and 21 men were shipped for them. A fee of $1 (not a statutory fee) was paid for each man. One vessel was bound to California, and 17 men were shipped for her.

FOURTH.

Sixty-six men were paid off from 9 vessels from coastwise voyages, as follows: Forty-eight men, from 3 vessels coastwise (California); 18 men, from 6 vessels from Atlantic ports coastwise.

FIFTH.

One hundred and eighty-five men were discharged and paid off from 18 vessels from foreign voyages.

SIXTH.

The average number, all told, to 100 tons register is 2 men to each 100 tons register.

The bark Vironica is 388 net tons, and carried about 4 men to 100 tons, viz, master, mate, second mate, cook, steward, and 8 seamen.

The ship Syren is 822 net tons, and carries about 2 men to 100 tons, viz, master, mate, second mate, cook, steward, and 10 men.

The schooner Lottie Beard is 288 net tons, carries about 3 men to 100 tons, viz, master, mate, cook, steward, and 4 men.

Three-masted schooners carry a master, mate, second mate, cook, and 4 seamen, irrespective of size, when they are employed in the coastwise trade.

SEVENTH.

The average wages of seamen shipped on coastwise voyages for each month is $20 per month for seamen, $30 for mates, $25 for second mates, and $30 for cooks and stewards. The average wages for crews shipped on foreign voyages for each month is $18 per month for seamen, $40 per month for mates, $30 for second mates, $35 for stewards, and $25 for cooks.

EIGHTH.

The law prohibiting the payment of advance wages has been no benefit to the seamen, as they have shipped at nearly all seaports for very small wages, and a present, bounty, or whatever you term it, has been given to the seaman, payable to the boarding-house keeper, or outside shipping offices, or clothing store; practically all vessels bound on foreign voyages have evaded the law. There is no change for the better in the conduct of the landlords.

NINTH.

The condition and habits of seamen have not improved in consequence of said law.

TENTH.

There is no improvement in the treatment of seamen at the sailor boarding-houses. Seamen arriving home without any money find it very difficult to obtain a boarding-house, more especially in the winter months when voyages are few, and seamen that get a boarding-house must submit and agree to ship for small wages, so that the landlord can get the present, bounty, or bonus, that is to be paid the seaman if he sails in the ship.

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ELEVENTH.

I don't think it practicable in a republican form of government to have officers of vessels of the United States to pass an examination and have certificates. Officers in the merchant marine of the United States are considered the best and most efficient in the world, and far ahead of Great Britain, that has this plan of examinations and certificates. Officers of our American vessels stand upon their own merits, and many of them could not pass a Government examination to-day, yet they are very efficient and capable for the position both in practice and theory. What, in my views, would tend to improve the service and safety of navigation, would be some legislation to compel vessels to carry a certain number of men to the 100 tons register, more especially vessels engaged in the coastwise trade. My observations on this point are that these vessels are not half manned with crews.

TWELFTH.

A regularly organized system of apprentices would tend to increase the efficiency of the merchant marine. Ship owners and masters object to take apprentices and green hands on board their vessels. A regularly organized system by the United States Government making provisions for boys with a fair education, from the several States, to be trained for the merchant marine, would increase the efficiency of the same.

THIRTEENTH.

The general health of seamen arriving and departing at this port is good.

FOURTEENTH.

No complaints relating to food or water have been made by seamen of any vessel of the United States arriving or departing from this port, and no cases of insubordination have come within my knowledge for the past year.

H. C. HATHAWAY,
United States Shipping Commissioner, New Bedford, Mass.

Hon. JARVIS PATTEN,
Commissioner of Navigation, Washington, D. C.

PORT OF NORFOLK.

UNITED STATES SHIPPING COMMISSIONER'S OFFICE,
Custom-House, Norfolk, Va., July 2, 1886.

SIR: In response to your letter under date of May 7, 1886, inclosing "a number of interrogatories concerning the business of my office" during the year ending June 30, 1886, I beg to inclose answers to the same, from 1 to 4 inclusive.

Very respectfully,

A. M. BULLOCK,
United States Shipping Commissioner.

Hon. JARVIS PATTEN,
Commissioner, Bureau of Navigation,
Treasury Department, Washington, D. C.

FIRST.

Vessels for which I have engaged crews during the year ending June 30, 1886..	409
Men shipped on same, classed as officers	30
Seamen shipped on same	817
Firemen shipped on same	28
The above number, natives	496
Foreign	449

SECOND.

Vessels bound on foreign voyage and required to pay the statutory fee were..	14
Vessels bound on foreign voyage and not required to pay the fee	73
Men required to pay the fee	67
Men not required to pay the fee	808

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THIRD.

Of the above number of vessels there were bound on other voyages..... 322
Of the above number of men there were bound on other voyages 808

FOURTH.

The number of parts of crews were 4, and men 6, as above, were paid off from coastwise voyages.

FIFTH.

The number of crews were 2, parts of crews 1, and of men, all told, 19 were discharged from foreign voyages.

SIXTH.

The average number of men, all told, to vessels of different sizes, was as follows:

Average crew to tonnage.	Mates.	Sail-maker.	Carpenter.	Steward.	Cook.	Able seamen.	Total.
Schooner, 100 tons	1				1	2	4
Schooner, 250 tons	1				1	3	5
Schooner, 350 tons	1				1	4	6
Schooner, 450 tons	2				1	4	7
Barkentines, 600 tons	2				1	5	8
Bark, 800 tons	2				1	6	9
Schooner, 1,100 tons (steam donkey)	2				1	6	39
Schooner, 1,300 tons (donkey)	2				1	7	10
Ship, 1,700 tons (no donkey)	3	1	1	1	1	15	22
Bark, 900 tons (no donkey)	2					8	10

Average seamen, 1.4 to 100 tons register.

The general average of men, all told, to vessels as above, is as follows:

	Men.
100 to 450 tons register, inclusive	1.105
600 to 900 tons register, inclusive	1.4
1,100 to 1,300 tons register, inclusive	1.9
1,700 tons register	1.5

SEVENTH.

The average wages of crews shipped each month were as follows:

Coastwise.—July, August, September, October, and November, 1885, for mates, $35; cook, $30; seamen, $19.

Coastwise.—December, 1885, January, February, and March, 1886, for mates, $40; cook, $35; Seamen, $20.

Coastwise.—April, May, and June, 1886, same as the first month above mentioned.

For the above-mentioned months on foreign voyages wages were as follows:

Ships.—Mates, $50; second mates, $40; third mates, $30; cook, $30; steward, $35; able seamen, $20; ordinary seamen, $16.

Barks.—Mates, $45; second mates, $35; cook and steward, $45; seamen, $20.

Brigs.—Mates, $40; second mates, $30; cook and steward, $35; seamen, $20.

EIGHTH.

My observations as to the operations of the law prohibiting the payment of advance wages at this port during the past year are, that it has been of much benefit to seamen, in causing them to be more soberly and more attentive to their respecttive duties on vessels, together with being more anxious to serve out the time for which they had shipped than formerly, as also, unemployed seamen seem to be more anxious to obtain employment.

NINTH.

The condition and habits of seamen seem to be greatly improved under the operations of the said law.

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TENTH.

The said law has had the effect in improving the treatment of seamen at the several sailor boarding houses here, as the conduct of their landlords seem to be more kindly than formerly, which is to be attributed to their abstinence from strong drink to a greater extent than usual.

In connection with the answer to the above I would suggest that, if boarding-houses could be established by the Government for the accommodation of its own seamen, in my opinion, would have the effect of better improving their habits and condition.

ELEVENTH.

With regard to the examination and certification of officers by the Government; in my judgment the adoption of such examination would tend to improve the service and safety of navigation. But it would, at the same time, exclude the greater number of shipmasters from employment who are now in command of vessels engaged in the coasting trade, by reason of lack of education to pass the ordeal of a *nautical examination;* but who, nevertheless, are well acquainted with the coast, and generally safely navigate their vessels.

TWELFTH.

With respect to the apprentice system: For many years past I have thought, and also at the present time and for the future, in my judgment, think that a regularly organized system of apprentices would tend to increase the efficiency of the merchant marine; as seamen, being thus educated previously, would be better qualified to discharge the duties of their places on board of vessels.

THIRTEENTH.

The general health of seamen who have arrived at this port has been good, with but very few exceptions.

FOURTEENTH.

There have been no complaints made to me of insubordination on vessels or abuse of men at sea, nor complaints by seamen as to quantity or quality of either food or water on American vessels.

PORT OF PENSACOLA.

PENSACOLA, FLA., *July* 23, 1886.

SIR: In reply to your favor of May 7, inclosing certain interrogatories, I have the honor to transmit the following:

FIRST.

Number vessels for which crews were engaged	21
Number men shipped	143
Number officers shipped	35
Native born	72
Foreign born	106

SECOND.

Number vessels for which crews were engaged	18
Number men shipped	190
Number officers shipped	26
Number men reshipped	4
Number officers reshipped	4
Native born	61
Foreign born	93

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THIRD.

Number vessels for which crews were engaged	3
Number men shipped	18
Number men reshipped	1
Number officers reshipped	5
Native born	11
Foreign born	13

Included in the above is one vessel bound to Cuba which paid the statutory fees.

FOURTH.

None.

FIFTH.

Number of crews and parts of crews engaged	21
Number of men shipped and capacities—	
Seamen	119
Officers	35
Cooks	21
Carpenter	1
Cabin-boy	1
Boatswain	1

The number of men and capacities to 100 tons register, viz:

SIXTH.

Tonnage.	Men.	Officers.	Cooks.	Seamen.
About 200 tons	6	1	1	4
From 300 to 400 tons	7	2	1	4
From 500 to 600 tons	8	2	1	5
From 900 to 1,000 tons	10	2	1	7
14,000 tons	20	2	2	16

The average number of men to 100 tons register is 1.53.

SEVENTH.

The average wages each month are as follows:

Month.	Foreign.	West Indies.	Coastwise.
1885			
July	$16	.....	.....
August	15	.....	.....
September	18	.....	.....
November	17	.....	.....
December	18	.....	.....
1886			
February	17	$18	.....
March	20	.....	$15
April	18	.....	.....
May	15	.....	.....
June	17	.....	10

EIGHTH.

In regard to the law prohibiting the payment of advance wages, I am inclined to believe that it has been violated. Am satisfied that the new law will work to the advantage of all parties concerned, but for better protection, think all American vessels should be compelled to ship before a commissioner.

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NINTH.

The seamen at our port seem, as a rule, to be very orderly and sober.

TENTH.

Noticed no difference in regard to the treatment of seamen at boarding-houses; no complaints have been made.

ELEVENTH.

I cannot but see how a thorough examination and certification of officers could but improve the service and safety of navigation.

TWELFTH.

A regularly organized system of apprentices, I think, would tend greatly to increase the efficiency of the merchant marine.

THIRTEENTH.

The general health of seamen arriving at our port has been good.

FOURTEENTH.

No complaints of any character whatever have been made to me.

Respectfully,

E. T. HUNT,
United States Shipping Commissioner.

Hon. JARVIS PATTEN,
Commissioner of Navigation, Washington, D. C.

PORT OF PASCAGOULA.

PASCAGOULA, MISS., *July* 1, 1886.

SIR: I have the honor to transmit herewith answers to the interrogatories propounded to me, which I have prepared and answered to the best of my ability and in accordance with the limited means at my disposal, trusting the same may be satisfactory.

Very respectfully,

C. H. ALLEY.
Shipping Commissioner.

Answers to interrogatories propounded to United States shipping commissioner at the port of Pascagoula, Miss., relative to the business thereat for the fiscal year ending June 30, 1886.

FIRST.

The number of vessels for which I engaged crews was five. Number of men shipped thirty-four, of which nineteen were native and fifteen of foreign birth.

SECOND.

The number of vessels bound on foreign voyages, and for which I engaged crews, was five, and the number of men shipped and required to pay the statutory fee thirty-four.

THIRD AND FOURTH.

None.

FIFTH.

The number of crews discharged from foreign voyages was fourteen, and sixty-nine men all told discharged from foreign voyages.

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SIXTH.

No large-size vessels have shipped crews at this port during the fiscal year. The average number to the 100 tons is about six, all told; a captain, mate, steward, and three able-bodied seamen to each additional 100 tons burden would require an average of two more men, to wit, a second mate and a seaman.

SEVENTH.

No crews were shipped during the fiscal year on coastwise vessels. Foreign-bound crews were shipped at an average of $22.50 per month.

EIGHTH.

My observation as to the operation of the law prohibiting the payment of advance wages is, that the result is a good one. It prevents the wholesale species of defrauding sailors out of their just wages by boarding-house keepers, unprincipled men, who run after them only to get money from them unjustly, and to which they are honestly entitled. I must again, as I did in my last report, indorse this wise provision of law.

NINTH.

The condition and habits of seamen are decidedly improved, especially to the class which it is applicable. They are improved in their general deportment and habits, especially in port seeking employment.

TENTH.

My observation of the effects of the law is that it has had a decided tendency in improving the treatment of seamen at the boarding-houses, from the fact it is generally understood they enter the same in the manner of boarders at a tavern or hotel prepared to pay the same, and not in the old-fashioned style of stealing off and leaving unpaid bills, especially those having no effects, and hence the landlords treat them in a respectable and humane manner, and there is a decided improvement.

ELEVENTH.

In regard to the examination of officers, similar to the British plan, the adoption of the same would, in my opinion, improve the service and safety of navigation, and in many instances cut off inefficient service.

TWELFTH.

In answer to this interrogatory I have to say that I do not see that any improvement can be made if the present law is enforced and properly applied.

I have had but little experience in this particular branch of the service, and only speak from opinion and not from any actual observation that I have made.

THIRTEENTH.

The general health of seamen arriving at this port is good.

FOURTEENTH.

None of the matters or things have occurred to my knowledge embraced in this interrogatory.

Respectfully submitted.

C. H. ALLEY,
Shipping Commissioner.

The COMMISSIONER OF NAVIGATION,
Washington, D. C.

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PORT OF PORT TOWNSEND.

PORT TOWNSEND, WASH., *June* 30, 1886.

Replies to the first, second, third, fourth, and fifth interrogatories propounded by the Commissioner of Navigation:

Date.	1.			2.			3.	4.	5.			
	Shipped, foreign.			Shipped for paying fee.			Shipped.	Discharged.	Discharged from foreign voyages.			
	Vessels.	Officers.	Seamen.	Vessels.	Officers.	Seamen.	Other voyages.	Coastwise voyages.	Vessels.	Seamen.		Seamen re-shipped on same vessels.
1885.												
July	5	10	39	5	10	39	0	0	9	85	11	145
August	8	14	65	8	14	65	0	0	5	48	10	127
September	12	24	144	12	24	144	0	0	7	56	10	234
October	13	20	123	13	20	123	0	0	4	48	19	210
November	6	13	56	6	13	58	0	0	2	24	8	103
December	5	10	52	5	10	52	0	0	2	21	6	89
1886.												
January	5	10	49	5	10	49	0	0	2	25	.....	84
February	6	9	45	6	9	45	0	0	5	47	20	121
March	3	6	21	3	6	21	0	0	4	45	7	79
April	4	8	46	4	8	46	0	0	6	81	14	149
May	8	15	91	8	15	91	0	0	3	31	17	154
June	7	14	60	7	14	60	0	0	5	62	6	142
	82	153	796	82	153	796	0	0	54	573	128	1,647

NOTE.—Of the total number of men shipped and discharged 11 per cent. are American and the balance foreign.

SIXTH.

Average number of men carried, all told, to the hundred tons register, about as follows, varying a little according to rig, viz: 400 to 600 tons, eleven men; 600 to 800 tons, thirteen men; 1,500 to 2,000 tons, sixteen to twenty men.

SEVENTH.

The average wages paid seamen (all foreign-bound; no coasters shipped during the year) was as follows:

Date.	Amount.	Date.	Amount.
1885.		1886.	
July	$23 00	January	$20 00
August	23 33	February	25 00
September	21 28	March	27 50
October	21 25	April	30 00
November	23 33	May	28 00
December	20 00	June	28 00

EIGHTH.

I am convinced from careful observation that the law operates very advantageously.

NINTH.

The treatment of seamen at the sailors' boarding-houses is decidedly better since my last report.

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ELEVENTH.

It is very evident that many of our officers are incompetent; such are employed because they can be secured cheaply. They would be debarred by the operation of a rigid examination board such as is in force under the British system. This would certainly tend to improve the service and safety of navigation.

TWELFTH.

A regularly organized system of apprenticeship would certainly be beneficial if the boys were placed in charge of good, able men, who take a pride in their calling, and who desire to see a successful American merchant marine.

THIRTEENTH.

Injury seems to result to seamen from too protracted and continuous service at sea. They invariably arrive from a long voyage jaded and worn. I think crews ought to always be discharged after coming off from deep-water voyages.

No epidemics have arrived or have been reported at this port.

FOURTEENTH.

No cases of insubordination have been reported to me, nor have any complaints been made to me as to food and water having been insufficient, or of inferior quality, on board of any vessel of the United States.

I am, very respectfully, your obedient servant,

HENRY BASH.

Hon. JARVIS PATTEN,
Commissioner of Navigation.

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APPENDIX NO. 2.

OF MARINE TRIBUNALS AND THEIR DUTIES.

[From a bill to amend and consolidate the navigation laws, introduced in the Fortieth Congress.]

SECTION 1. There shall be established at each of the collection districts, for a marine district, embracing waters hereinafter described, a marine board consisting of three members, except the board established at the city of New York, which shall consist of five members, namely: At Portland, for the waters for the coast of Maine and New Hampshire and the waters tributary thereto; at Boston, for the coast of Massachusetts and Rhode Island and the waters tributary thereto; and the city of New York, for the waters of the southerly coast of the State of New York, the coast of Connecticut, and the easterly coast of New Jersey and the waters tributary thereto; at Philadelphia, for the waters of Pennsylvania east of the Alleghany Mountains, and the coast of Delaware and the waters tributary thereto; at Baltimore, for the waters of the coast of Maryland, the District of Columbia, and Virginia and the waters tributary thereto; at Savannah, for the waters of the coast of North Carolina, South Carolina, Georgia, and the easterly coast of Florida to Cape Sable and the waters tributary thereto; at Mobile, for the waters of the coast of Alabama and the western coast of Florida from Cape Sable and the waters tributary thereto; at New Orleans, for the waters of the coast of Louisiana and Mississippi and the waters tributary thereto, except the Arkansas River and so much of the Mississippi River and the waters tributary thereto as are north of the mouth of the Arkansas River; at Galveston, for the waters of the coast of Texas and waters tributary thereto; at San Francisco, for the waters of the coast of California and the waters tributary thereto; at Portland, for the waters of the coast of Oregon and Washington Territory and the waters tributary thereto; and such boards shall be designated coast marine boards. And there shall be established a marine board at each of the following collection districts, namely: At Louisville, for the waters of the Ohio River and its tributaries below the town of Madison, and the Mississippi River and its tributaries from the Ohio River down to and including the Arkansas River and its tributaries; at Cincinnati, for the waters of the Ohio River and its tributaries above and including the town of Madison; at Saint Louis, for the waters of the Mississippi River and its tributaries from the mouth of the Ohio River to the town of Quincy, in Illinois; at Galena, for the waters of the Upper Mississippi River and its tributaries above Quincy and of the Red River of the North; which boards shall be designated inland marine boards. And there shall be established a marine board at each of the following collection districts, namely: At Ogdensburg, for the waters of Lakes Ontario, Champlain, Memphremagog, and George, and of the river St. Lawrence, and their tributaries; at Buffalo, for the waters of Lake Erie and its tributaries; at Detroit, for the waters of Lakes Huron and Superior and their tributaries; at Chicago, for the waters of Lake Michigan and its tributaries; which boards shall be designated lake marine boards. The members of such boards shall be competent men, of good character, and shall have special knowledge of and experience in shipping and navigation, one of whom, and two of the board established at the city of New York shall be selected for knowledge, skill, and experience in the uses of steam for navigation, and shall be a competent judge, not only of the character of steamers, but of all parts of the machinery employed in navigating by steam; and the person who at the time this act takes effect shall be supervising inspector at any of the foregoing collection districts shall constitute a member of the marine board there established; and before entering upon the duties of their respective offices, they shall be sworn to the faithful discharge of the same before the collector of the district; and they shall be appointed by the President, by and with the advice and consent of the Senate, and shall be removable only for misconduct, unfitness for or neglect of the duties of their office. The first members of every board shall be appointed, one for seven years, one for five years, and one for three years; and their successors shall be appointed for terms of seven years; and any vacancy occurring in the board

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before the expiration of a term of office shall be filled for the residue of the unexpired term. The compensation of members of a marine board shall be ten dollars each for every day of service and his necessary expenses incurred in the discharge of the duties of his office.

SEC. 2. Every marine board shall have a clerk, who shall be appointed by the board, subject to the approval of the Secretary of the Treasury. The annual salary of the clerks of the boards at Boston, New York, New Orleans, and San Francisco, shall be $1,500, and the annual salary of clerks of the other marine boards shall be $750.

SEC. 3. It shall be the duty of every marine board to examine persons who intend to become masters, first mates, or second mates of vessels of the United States, or chief engineers, second engineers, third engineers, fourth engineers, chief pilots or second pilots of steamers, and who wish to procure the certificates of competency hereinafter mentioned; the Secretary of the Treasury shall prescribe rules and regulations as to such examinations and the qualifications of applicants for certificates, and such rules and regulations shall be strictly adhered to by all marine boards; and such boards may, with the consent of the Secretary of the Treasury, and as occasion may require, appoint persons to make such examinations of such masters, mates, and pilots, and may issue certificates based upon the reports of such persons, the compensation of whom shall in no case exceed $7 for every day of service, and his necessary expenses; and such boards may, with the consent of such Secretary, require boards of inspectors to make examinations of such engineers and pilots, and may issue their certificates upon the reports of such inspectors.

SEC. 4. Engineers shall be classified into chief engineers, second engineers, third engineers, and fourth engineers, and pilots into chief pilots and second pilots, according to their relative subordination and control in the discharge of their duties; and masters and chief engineers shall be classified by said boards into four grades, first mates and second mates, second engineers and third engineers into three grades, and chief pilots and second pilots into two grades, according to the tonnage of the vessels for which they shall respectively be found competent, and according to the schedule numbered — in the schedule hereto annexed.

SEC. 5. For the purpose of assigning such masters, first mates, and second mates to the class of vessels and of voyages for which they shall be found, on examination, competent, such vessels are divided into two classes; the first to comprise of all vessels propelled in whole or in part by steam; the second to comprise of all vessels propelled wholly by sails. And voyages shall be divided into two classes; the first class shall comprise voyages to any foreign country not contiguous to the United States. The second class shall comprise all other sea voyages, and voyages on any of the waters of Lakes Superior, Huron, Michigan, Erie, and Ontario; and for the purpose of assigning chief engineers, second engineers, third engineers, and fourth engineers to the class of voyages for which they shall be found competent, voyages shall be divided into three classes: the first and second classes of voyages shall comprise, respectively, the first and second classes of voyages as hereinbefore defined, and the third class shall comprise all other voyages upon waters of the United States.

SEC. 6. The marine board shall deliver to every applicant who has passed an examination satisfactorily, and has given satisfactory evidence of his sobriety, character, knowledge, experience, ability, and general good conduct on shipboard, a certificate signed by at least two members of the board, to be designated a certificate of competency, which shall certify the grade as master, first mate, second mate, chief engineer, second engineer, third engineer, fourth engineer, chief pilot, or second pilot, and the class of vessels and voyages for which the applicant is found to be competent. The certificate of competency granted to masters, first mates, and second mates, by a lake marine board, shall be valid only for the navigation of any of the waters of such lakes and the waters connecting them; and that of a sea-coast board, granted to such masters and mates, shall be valid only for the navigation of the sea; the certificate of a pilot shall in all cases define the route for which the applicant is found competent; and such certificate shall be according to the form numbered —, in the schedule hereto annexed. Every certificated engineer and pilot shall, before entering upon his duties, make solemn oath or affirmation before one of the members of the board, each of whom is hereby authorized to administer the same, or before some other officer competent to administer oaths, that he will faithfully and honestly, according to his best skill and judgment, perform all the duties appertaining to the position for which his certificate is granted.

SEC. 9. Such certificate of competency shall be valid for three years only, or the voyage during which the term of a certificate shall expire, unless the same shall be renewed by some marine board. Every coast marine board shall have the authority to renew the certificates issued by any other coast marine board to such masters or mates, and every lake marine board shall have authority to renew such certificates of any other lake marine board, but not otherwise; and every marine board shall have the right to renew the certificates of engineers by whatsoever boards they may

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have been granted. But no board shall grant or renew the certificate of a pilot, a portion of whose route is not within the marine district of such board.

SEC. 10. Applicants for certificates of competency and for renewals of such certificates shall pay for the same the fees prescribed in the schedule hereto annexed, numbered —, which fees shall be paid to any collector of customs, who shall give a receipt for the same. And no application for a certificate, or a renewal of the same, shall be received by the board except on presentation of such receipt of a collector showing that the fee of the same has been paid.

SEC. 11. Every marine board may revoke or suspend any certificate of competency if, upon investigation, the holder of such certificate shall be found to have shown incompetency or unfitness for his position, or to have been guilty of drunkenness, or any gross act of misconduct, or if the loss or abandonment of, or serious damage to any vessel or cargo, or loss of life, injury, or distress to passengers has been caused by his wrongful act or default. And cruel and tyrannical treatment of seamen shall be a ground for the revocation or suspension of the certificate of a master, first mate, or second mate. And if any certified engineer or pilot *shall wrongfully or unreasonably refuse* to serve as such on any steamer, as authorized by the terms of his certificate, or shall fail to deliver to the applicant for such services at the time of such refusal, if the same shall be demanded, a statement in writing signed by such engineer or pilot, of the reasons thereof; or if any pilot shall refuse to admit into the pilot-house with him any person or persons whom the master, owner, or owners of any steamer may desire to place there for the purpose of acquiring the knowledge of piloting, his certificate shall be immediately revoked upon the same proceedings as are herein provided in other cases of the revocation of such certificates. And that board shall have jurisdiction of the question of the suspension or revocation of a certificate within whose marine district the alleged cause for such revocation or suspension occurred; or if such shall not occur within the marine district of any board, the board within whose limits the delinquent shall first come after the occurrence of such cause shall investigate the case; but the Secretary of the Treasury may assign the investigation of any such case to such board as he may designate. No such certificate shall be revoked or suspended unless notice shall have been first given to the holder of the same, of the grounds of the proceedings against him and an opportunity given him to be heard in his defense. Every such revocation and suspension shall be made subject to the approval of the Secretary of the Treasury. And it shall be lawful for the Secretary of the Treasury, if he thinks the justice of the case so requires, to reissue and return any certificate which has been canceled or suspended, or shorten the time for which it has been suspended, or grant a new certificate for the same, or any lower grade in place of any certificate which has been canceled or suspended. And such new certificate, renewed or returned certificate, shall be subject to the same provisions of law as it would be if issued by the appropriate marine board.

SEC. 12. Every holder of a certificate of competency, the revocation or suspension of which is a subject of investigation by a marine board, and every person whose certificate has been revoked or suspended by a marine board, shall, on the demand of such board, deliver up his certificate to such board, and in default, shall, for each offense, incur a penalty of three hundred dollars.

SEC. 13. It shall be the duty of every such marine board, when it has reasonable cause to believe that an applicant for the renewal of his certificate is not entitled to the same to withhold such renewal and examine such applicant, in which case the same provisions of law shall be applicable as in the case of an original application for a certificate; but if such applicant for a renewal of his certificate shall be found entitled to the same, the collector shall refund the difference between the fee in the case of an original application for a certificate and the fee for a renewal of the same, upon the presentation of such renewal of his certificate.

SEC. 14. Every certificate of competency for one grade of service and class of vessels and voyages granted to masters, mates, or engineers, shall entitle the holder of such certificate to serve in the same, or any lower grade of service, in the same class of vessels for the same, or any lower class of voyages of the same kind, as regards being lake or sea voyages, but not otherwise; but the certificate of a pilot for one grade of service shall entitle the holder to serve in the same or any lower grade of service on the same route, but not otherwise.

SEC. 15. Whenever any master, mate, engineer, or pilot proves to the satisfaction of a marine board that he has, without fault on his part, lost or been deprived of any certificate or renewal of the same, which such board has already granted to him, such board shall, upon payment of the fee required in the case of the renewal of a certificate, cause a copy of the certificate or the renewal of the same to which, by the record kept by such board he appears to be entitled, to be made out and certified by a member of the board and delivered to him. And any such copy, so made and certified, shall be of the same effect as the original.

SEC. 16. No vessel of the United States bound on a voyage of the first class, and no such vessel bound on a voyage of the second class, and carrying passengers or be-

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ing of 150 tons burden or upwards, and no foreign vessel carrying passengers, shall, after this act takes effect, depart from any port of the United States, unless the master, first mate, and second mate of such vessel, according as she is officered, shall respectively have certificates of competency corresponding to the class of vessels to which such vessel belongs, and to the grade of master, first mate, or second mate, respectively, appropriate to such vessel and to the class of the voyage on which she is bound, as such classes and grades are herein defined; and no passenger steamer or freight steamer of the United States, and no foreign passenger steamer shall depart from any port of the United States unless she shall have in her service her complement of engineers and pilots, who have certificates of competency appropriate to the service in which they are employed; and in every case involving an inquiry into the seaworthiness of any vessel so departing in violation of the provisions of this section, such vessel shall be deemed unseaworthy unless proved to be seaworthy; and every sea-going steamer of the United States shall, when under way, except upon the high seas, be under the control and direction of duly certified pilots, and in default, the master, owner, or owners of such sea-going steamer shall incur a penalty of $100 for each offense.

SEC. 17. Every person who shall go as a master, mate, or engineer of a vessel on a voyage, or as a pilot on a route, without being entitled so to do by his certificate of competency, shall incur a penalty of $300; and in any case involving an inquiry into the conduct of any person acting as a master, mate, engineer, or pilot without being entitled so to do by a proper certificate, shall be deemed to be in default unless the contrary is proved; and every person who shall employ another to go as a master, mate, or engineer of a vessel on a voyage, or as a pilot on a route, who has no certificate, entitling him so to do, having reasonable cause to believe that such person so employed has no such certificate, shall incur for each offense a penalty not exceeding $300; but if a vessel leaves her port with her complement of duly certificated officers, engineers, and pilots, and on her voyage is deprived of their services, or the services of any of them without the consent, fault, or collusion of the master, owner, or any one interested in such vessel, it shall be lawful to supply the deficiency temporarily by uncertificated persons until others duly certificated can be obtained.

SEC. 18. Every person who makes or procures to be made, or assists in making, any false representation for the purpose of obtaining for himself or another person a certificate of competency, or a renewal of the same, or who forges, assists in forging, or procures to be forged, or fraudulently alters, or assists in fraudulently altering, or procures to be fraudulently altered, any such certificate or renewal of the same, or any official copy of any such certificate or renewal of the same, or who fraudulently makes use of any such certificate or renewal of the same, or any copy of the same which is forged or altered, or to which he is not entitled, or which he is not entitled to use, or who fraudulently lends his certificate, or any renewal of the same, or allows the same to be used by another person, shall for each offense be punished by a fine not exceeding $300 or imprisonment not exceeding six months, or both, according to the aggravation of the offense.

SEC. 19. It shall be the duty of every such marine board to investigate, or cause to be investigated, under such direction and regulations as the Secretary of the Treasury may prescribe, the causes of shipwrecks, disasters, and accidents happening to and on board any vessel of the United States within its district, or on any voyage from or to a port within its district; and the board of that district which comprises the port of departure, or of that district which comprises the port of destination in such voyage, if such ports are in different districts, shall make the investigation of any shipwreck, disaster, or accident happening within the limits of no district; according as the district of one board is nearer than the district of the other board to the place of such shipwreck, disaster, or accident, unless the Secretary of the Treasury shall otherwise direct. And such boards shall make, under the direction of the Secretary of the Treasury, any investigations concerning vessels of the United States, which the public interest, in his judgment, requires; and they shall report to the Secretary of the Treasury such investigations and the results of the same, and especially all violations of the provisions of this and the following title which shall come to their knowledge in the course of such investigations; and when it shall appear that there has been a violation of such provisions, they shall inform the district attorney of the United States for the district in which the offense has been committed, that such attorney may enforce the penalties of such offense; and they shall commence proceeding for the suspension or revocation of any certificate the holder of which appears to have given cause for the same.

SEC. 20. Every marine board and every justice of the peace and commissioner appointed by a circuit court of the United States and designated by such board to take testimony in any matter which by this act such board is required to investigate, shall have the power, by the same process as in courts of law, to summon before them witnesses and compel them to attend and give evidence under oath or affirmation, at such times and places as may be specified, as to any matters in respect to

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which such boards have a right to examine or investigate; and if any witnesses so summoned shall, when under examination on oath or affirmation, knowingly and intentionally falsify the truth, such persons shall be deemed guilty of perjury, and, if convicted, shall be punished accordingly; and the collector of customs in the collection district at which such board is established shall pay out of the revenues herein provided such sums to any witness so summoned under the provisions of this section, for his travel and attendance as shall be officially certified by such marine board upon the back of the summons, not exceeding the rates allowed to a witness for travel and attendance in the district courts of the United States, and shall pay to such magistrates for the depositions the fees allowed for depositions in such courts.

SEC. 21. Every such marine board shall keep a regular record of applications for certificates, reports of examiners of applicants, examinations of applications, all certificates granted, all revocations, suspensions, and renewals of certificates, all investigations made by such board, and its other doings; and it shall report from time to time its decisions on application for certificates, the certificates granted, and its other proceedings to the Secretary of the Treasury, who may prescribe regulations in respect to the records and reports aforesaid. And it shall be the duty of every coast board to report to other coast boards, and every lake board to report to the other lake boards, the names of all persons to whom it has granted certificates as masters or mates, and the grades of service, classes of vessels, and voyages for which such certificates are issued, and the names of all persons whose application for such certicates are refused, or whose certificates as masters or mates are revoked or suspended by such board; and every board shall report to every other board the names of all persons to whom it has granted certificates as engineers, and the grades of service and voyages for which such certificates are issued, and the names of all persons whose applications for certificates as engineers are refused, or whose certificates as engineers are revoked or suspended by such board; and every board shall report the names of all persons to whom it has granted certificates as pilots to every board within whose marine district the route, or any part of the route, defined in any such certificates may be, and the grades of service for which they are issued; and it shall report the names of all persons whose applications for certificates as pilots have been refused, or whose certificates have been revoked or suspended to every marine board within whose district the route, or any portion of the route, named in any such application or certificate may be. And no board shall issue a certificate to any person whose certificate has been revoked, or whose application for a certificate has been refused by another board of the same kind, whether coast or lake, in the case of masters and mates, or by any board in the case of engineers, or by any board whose marine district embraces any part of the route in the case of pilots, or to any person whose certificate is suspended. And every such board shall keep a record of the names of all such persons in respect to whom it shall receive notice from other boards, and a record of the action of such boards in relation to such persons, their applications and certificates. But the rejection of an application for a certificate of competency, as master, first mate, second mate, chief engineer, second engineer, third engineer, fourth engineer, chief pilot, or second pilot, by one board, shall not preclude such applicant from obtaining from any other board a certificate of competency for a lower position, without regard, however, to the grades of service, as defined by this act, and applicable to such position, or for a different class of vessels, or voyages, or for a different route.

SEC. 22. Every such marine board shall have the direction and control of the boards of inspectors hereinafter mentioned established within the marine district of such marine board; and no certificate of approval issued by any such board of inspectors shall be valid unless countersigned by at least two members of such marine board; and such marine boards shall exercise a general supervision over the vessels and seamen of the United States belo ging to the marine districts respectively assigned to them, shall visit, confer with, and examine into the doings of the several boards of inspectors and see that such inspectors execute their duties faithfully, promptly, and as far as possible uniformly in all places; and they shall, whenever they think it expedient, visit the vessels subject to inspection and examine into their condition, and they shall see that the masters and owners of such vessels comply with the provisions of titles and of this act; and it shall be the duty of all certificated masters, first mates, second mates, pilots, and engineers to give all the information in their power in regard to any such vessel, her boilers, machinery, and equipment, and the mode of managing the same, and all other matters into which such boards are bound to inquire.

SEC. 23. The marine board shall, within their respective districts, under the direction of the Secretary of the Treasury, take the examination or receive the statements in writing of persons of practical knowledge and experience in the navigation of steamers, the construction and use of boilers, engines, machinery, and equipments, touching the form, material, and construction of engines and their appurtenances; the causes of the explosion of boilers and collapse of flues, and the means of prevention; the

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kind and description of the safety-valves, water-gauges, and steam gauges, or indicators; equipment for the extinguishment of fires, and for the preservation of life in case of accident on board of steamers, and all other means in use or proper to be adopted for the better security of the lives of persons and property on board steamers; the advantages and disadvantages of the different descriptions of boilers, engines, and their appurtenances, safety-valves, water-gauges or indicators, equipments for prevention or extinguishment of fires, and the preservation of life in case of accident in use on board steamers; whether any and what further legislation is necessary or proper for the better security of the lives of persons on board steamers; which examination and statements so taken and received shall be transmitted to the Secretary of the Treasury at such time as he shall prescribe.

SEC. 24. It shall be the duty of the Secretary of the Treasury to cause such interrogatories to be prepared and published as in his opinion may be proper to elicit the information contemplated by the preceding section, and, upon the receipt of the examination and statements taken by the marine boards, he shall report the same to Congress, together with the recommendation of such further provisions as he may deem proper to be made for the better security of the lives of persons on board steamers.

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APPENDIX NO. 3.

(Pro forma.)

NEW LEGISLATION RECOMMENDED FOR THE PROTECTION OF THE SEAMEN.

A BILL to amend the laws relating to the shipment, discipline, and protection of seamen.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That section 4608 of the Revised Statutes be amended so as to read as follows: No seaman employed in the merchant service of the United States shall bring on board of any vessel fire-arms, dirk, or sheath knives, or other dangerous weapon. The knives used by the seaman on board shall be furnished by the vessel at the same price and proportion above cost as other articles furnished from the slop-chest. The regulation knife for the merchant service to be a sheath knife, or jack-knife with lanyard, the blade of which shall be not less than three-quarters of an inch square at the end. The supply of such knives to be regulated by the number of the vessel's crew and the length of the voyage—not less than two to each seaman in short voyages, and more in proportion for long voyages, the said knives to be inspected by the first officer of the vessel before leaving any port. The penalty for non-compliance with this statute is one hundred dollars ($100) on the part of any vessel, and twenty dollars ($20) on the part of any seaman, one-half of which is to go to the informer.

SEC. 2. No person not authorized by the Government, or local regulations, or invited by the master, shall be allowed to board any vessel, whether national or foreign, on her arrival at any port of the United States. When a vessel is about to arrive, or has arrived, at the end of a voyage at a port of the United States, every person not being in the employ of the Government, or not duly authorized by law for the purpose, who goes on board the ship without the permission of the master before the seamen lawfully leave the vessel at the end of their engagement, or are discharged (which ever last happens), or, being on board the vessel, remains there after being warned to leave by the master, or by the pilot, or an officer of the police, or by any officer of the customs, shall for every such offense be liable on conviction to a fine not exceeding one hundred dollars, or, at the discretion of the court, to imprisonment for a term not exceeding six months; and the master of the vessel, or any of the aforesaid officers may take him into custody and deliver him up forthwith to a constable to be taken before a court or magistrate competent to take cognizance of the offense and dealt with according to law.

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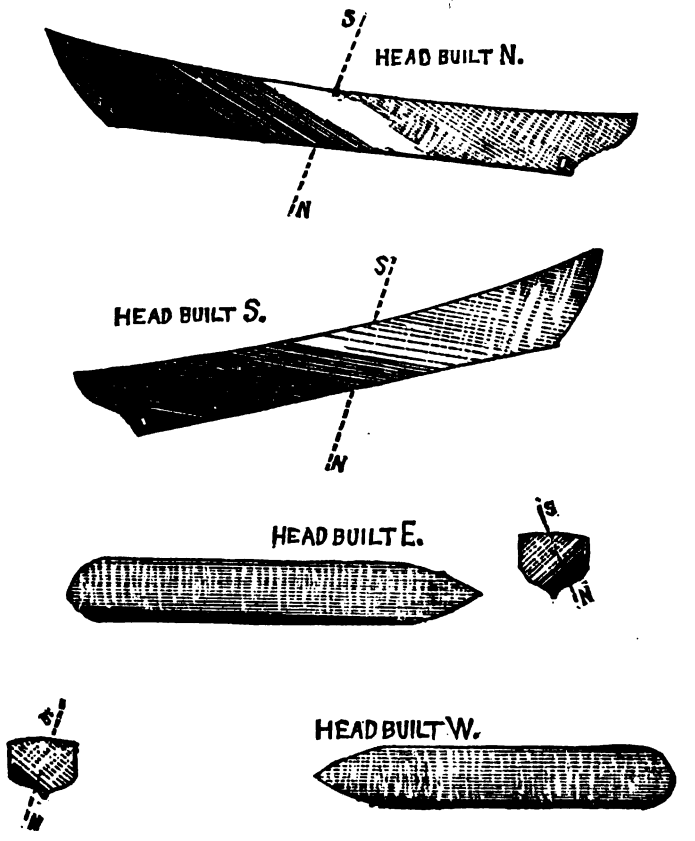
APPENDIX No. 4.

MAGNETISM OF IRON SHIPS AND THE MARINER'S COMPASS.

[Extract from a paper read before the Society of Arts by Professor Bottomly, of the University of Glasgow, Scotland.]

It was Dr. Scoresby who first called attention to the remarkable fact that the magnetic character of a ship depends essentially on the direction of her head while building, and that this original magnetism is subject to great changes after launching. The diagram shows the distribution of this magnetism, which is usually called the permanent magnetism, for ships built in this country with their heads in the directions north, south, east, and west.



In the upper drawing the ship is represented as having been built with her head magnetic north. In this case the upper part of the stern being farthest from the north acquired blue magnetism strongly, while the lower part of the bow acquires red mag-

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netism strongly. Between these extremes there is a neutral zone running from the upper part near the bow to the keel near the stern post. The intensity of the blue and red magnetism of the stern and bow gradually diminishes towards this zone. In such a ship the north point of the compass will be attracted toward the stern and the south point toward the bow.

The next drawing represents a ship built head magnetic south. Here we have the upper part of the bow a powerful blue pole, while the lower part of the stern is a powerful red pole. In this case the north point of the compass will be attracted towards the bow.

With the ship built head east or west the whole upper part of ship will have blue magnetism, and the lower part red magnetism; but in the former case the starboard side being farther from the north will be more powerfully blue than the port side, so that the north point of the compass card will be attracted to the starboard side, whereas with the ship built west the port side will be more powerfully magnetic than the starboard side, and north point of the compass card will be attracted to the port side.

The resultant of all the magnetism thus acquired gives rise to a single disturbing force of the same character as that which would be produced by a permanent steel magnet. I have spoken of this part of the magnetism of the ship as permanent magnetism. It is permanent in direction, but it is liable to change in amount with time, especially so when the ship is new. The change is greatest just after launching, and if the ship is then turned round and kept with her head in the opposite direction to what it was before launching, a large part of the magnetism which is not firmly hammered into the iron will be lost. It is most important that every new ship after launching should be turned round and kept with her head in the opposite direction while fitting out for sea, so that she may lose as much as possible of the magnetism which has not been firmly hammered into her before having her compasses adjusted. This is a matter which is very much overlooked at present. It is most desirable that naval architects or others who superintend the construction of iron ships should insist on having it done. I would suggest that a clause should be added to all the contracts for new ships, that after launching the ship should be turned round and kept while fitting out with her head as nearly as possible in the opposite direction to what she was on the stocks. I have known many cases where this has not been attended to, in which the magnetism changed so much within a few days as to cause serious inconvenience and danger in the navigation of the ship. One instance, which came under my notice a few years ago, will show the importance of having the ship turned round. A large passenger ship was built with her head nearly south, and fitted in the same direction. Her compasses were carefully adjusted, and after that she remained swinging to her anchor in a tide way, so that her head turned to different directions each tide for a week. Before she left for her first voyage, I went on board to ascertain the errors of her standard compass, as I expected to find a considerable change. I found on some points there was as much as 10 degrees of difference of error from what there had been a week before. The ship by swinging to her anchor for a week had lost an amount of magnetism sufficient to produce an error of 10 degrees on the compass. Since that time several other ships similar in every way have been built by the same builders for the same company, but they have been turned round after launching, and there has been comparatively little change in their magnetism. The importance of this was pointed out thirty years ago by Dr. Scoresby, and recommended by the late Sir Frederick Evans, but shipbuilders and others are in much need of being reminded of it now.

The effect of the magnetism of the hard iron is to produce an error on the compass which vanishes when the ship's head is on two opposite points, and attains a maximum amount in each semicircle as the ship turns round.

It has, therefore, been called a semicircular error. I may illustrate the effect of the permanent magnetism of the ship by fixing a steel magnet on this frame and turning it round the compass. The frame will represent a ship in which the magnetism is altogether permanent magnetism. When the line of the disturbing magnet is in a line with the compass needles no deviation is produced. As the ship's head is turned round the deviation increases until it attains a maximum, when the line of this disturbing force is at right angles to the compass needles. It then gradually diminishes and again comes to zero. Continuing to turn the ship, we find a deviation again appears, but in the opposite direction to what it was in the other semicircle. It attains a maximum, and comes to zero at the place of starting.

You will now readily understand that as this magnetism, which is hammered into the hard iron of the ship, gives rise to forces the resultant of which is a single magnetic force acting in a definite direction in the ship, its influence on the compass may be neutralized by placing a steel magnet with its poles in the opposite direction at such a distance from the compass that it will exactly counterbalance the magnetism of the ship. This is one of the plans which Sir George Airy proposed in 1838, and which is used for correcting the standard compasses in the Navy. The amount and

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direction of the ship's permanent magnetism at the position of the compass is first determined. A steel magnet is then selected, and the distance found by trial where it will produce the same force on the compass needle as the ship's magnetism does at the position of the compass on board. A hole is bored in the wooden stand at the right distance from the compass needle and the magnet inserted with its poles acting in the opposite direction to the ship's magnetism.

The second of Sir George Airy's plans, and which is the simplest and most convenient, is generally adopted in the merchant service. It is to apply two magnets, one set fore and aft and the other set thwartship to counterbalance the fore-and-aft and thwartship component of the ship's magnetism.

We have now to consider the action of the soft iron magnetized by induction from earth, and it is necessary to divide this into two parts—the magnetism induced by the earth's vertical force and the magnetism induced by the earth's horizontal force.

All the vertical iron of the ship becomes magnetized by induction from the vertical component of the earth's magnetic force. In the northern hemisphere, the upper parts of the vertical iron attract the north point of the compass card; in the southern hemisphere the south point. The effect of vertical iron on the compass may be illustrated by moving a vertical rod of soft iron round the suspended needle. Let the bar be kept with its upper end about the same level as the needle. Now, in whatever position the upper end of the bar is held, the north point will always be attracted towards it. Consequently, when the bar is held in the line of the needle, there is no deviation, but when it is a line at right angles to the direction of the needles a maximum error is produced, which is easterly when the bar is to the east of the needle, and westerly when it is to the west. Thus we have a semicircular error produced by a vertical bar carried round the compass. All the vertical iron acts similarly, and produces a semicircular error as the ship is turned round in azimuth. The amount of this error will vary in the same ship according to the position of the compass with regard to the vertical iron. In some positions, where the iron is symmetrically distributed fore and aft, and also athwartship, the attractions on opposite sides may neutralize each other and no error will be produced, while in other positions there may be large errors. For a compass in the same position in the ship, the error will vary in different parts of the world as the vertical force of the earth changes.

The force on the compass due to magnetism induced in the soft iron of the ship by the vertical component of the earth's magnetism is constant in direction in the ship, but it varies in amount in proportion to the earth's vertical force. The error which it produces on the compass varies, therefore, directly as the earth's vertical force, and inversely as the earth's horizontal force, or what is the same thing, directly as the tangent of the dip.

The error caused by induction in vertical iron is usually corrected along with the permanent magnetism by means of steel magnets. This plan is objectionable, except for ships trading in the same latitude, became the earth's vertical force, which produces the error, varies in different parts of the world, whereas the force applied to correct it remains constant. This error is really the same as that observed by Captain Flinders in his wooden ship, and the proper way to correct it is that which he suggested, namely a bar of vertical soft iron placed in such a position as to produce a force on the compass needles equal and acting in an opposite direction to the ship's force.

The Liverpool compass committee had such a bar fitted to the steering compasses of several ships, and Captain Lecky has applied it with remarkable success to the compasses of several ships in the merchant service. The binnacle of Sir William Thompson's compass is fitted with a brass tube for holding this Flinders bar, and whenever the requisite information can be obtained for determining the size of bar required for any particular compass in a ship it is applied. The application of the Flinders bar has been of great service in a large number of ships. It is particularly useful for mail steamers making regular passages between this country and the southern hemisphere. In such cases, after the ship has made one or two voyages, it is quite possible to adjust the length of the bar so that the change in error from vertical induction will not exceed 2 or 3 degrees in going from England to the Cape of Good Hope.

When a compass is placed in a new ship, it is impossible to tell with accuracy how much of the semicircular error should be corrected by Flinders bar, and how much by steel magnets. To determine the amount of Flinders bar required it is necessary to have observations of the deviations in two places, differing considerably in magnetic latitude. But even in a new ship an experienced adjuster can generally place a bar so that there will at all events be less change with change of latitude than if the whole semicircular errors were corrected with steel magnets. Similar ships with the compass placed in similar positions will generally require about the same amount of Flinders bar. As an illustration I may refer to the Donald Currie mail steamers between London and the Cape. Ten ships for this line have been supplied with the

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binnacle fitted with the receptacle for the Flinders bar. It has been found, after making one or two voyages to the Cape, that in all these ships the Flinders bar is required to be placed on the fore side of the binnacle, and that the amount of error to be corrected in London varies from 10 to 15 degrees. In six of the ships the error to be corrected was 13 degrees. Now in any other new ship similar to these, and with the compass similarly placed, it would be quite safe to apply a bar at the first adjustment to correct about 13 degrees in London. If the whole semicircular error in these Cape mail steamers were corrected in this country by steel magnets, there would be a change in the deviations on east and west courses of from 16 to 24 degrees every voyage to the Cape. The application of the Flinders bar diminishes the amount of change in deviation by that amount. In order that the Flinders bar may not give rise to error through becoming personally magnetized, it should be large enough in diameter in proportion to its length not to become magnetized by hammering.

We have seen that the permanent magnetism of the ship and the induced magnetism from the earth's vertical force, both produce an error of the same nature as the ship's head is turned in azimuth, namely, a semicircular error, but the deviation produced by the induced magnetism from the horizontal force follows a different law.

In this case, as the ship is turned round in azimuth, the direction of the force on the compass due to magnetism induced by the earth's horizontal magnetic force remains fixed with regard to the earth's magnetic meridian, but changes with respect to the direction of the ship's head. With the permanent magnetism, and with the magnetism induced in vertical iron, the direction of the disturbing force remained constant in the ship, and, therefore, varied in space as the ship turned round, but with the magnetism induced in horizontal iron the direction remains constant in space. Let us see how this affects the compass.

It may be illustrated by this arrangement: In this cradle there are two hollow globes of cast-iron, with their centers on a level with the compass needles. The result is that the magnetism induced by the vertical component of the ship's magnetism does not affect the compass, and the whole disturbance is caused by horizontal magnetic force. This will represent an actual ship with regard to its horizontal magnetic force; with a compass placed on the central fore-and-aft line, so that the iron is symmetrical on each side. Now, as the globes are turned round the compass needle, the induced magnetism in the globe changes in direction with respect to a fixed meridian of the globe. The line joining the center of the globes will represent the length of the ship. I will now turn the cradle containing the globes. When the line joining the center of the globes is north and south, the northern parts of the globes will acquire red magnetism, and the southern portions blue. In this position no deviation is produced, because the resultant of the horizontal lines of magnetic force will be in the magnetic axis of the compass, but the force acting on the compass-needles will be increased. As the northern globe is turned towards the east, the north point of the compass card will be drawn towards the east, and the deviation will increase until the direction of the globes in NE. From this point the deviation gradually diminishes until the globes become east and west, when no deviation is produced, but the directive force acting on the needles is diminished. Now, as we turn the globes further round, the north point of the compass card will be drawn towards the west, and the deviation will increase until the globes are SE. and NW. It then diminishes until the globes are in the north and south line, when there will be no deviation, but the force will be increased. Continuing the operation in the other semicircle, we shall obtain a repetition of these results. With the globes SW. and NE. easterly deviation will be found; with the globes east and west there will be no deviation, and when the globes are NW. and SE. there will be westerly deviation. The effect of magnetism induced from the horizontal force of the earth may be illustrated by the diagram, which represents a horizontal plate of iron placed in different positions round a compass-needle. Thus the magnetism induced by the earth's horizontal force causes a deviation which attains a maximum in each quadrant, and is of opposite name in each adjoining quadrant. It has, therefore, been called quadrantal error.

Now, the magnetic force which causes the quadrantal deviation being induced by the horizontal force of the earth, its magnitude is proportional to that horizontal force, and as the directive force on the compass needles is also proportional to the same horizontal force, it follows that the deviations produced by the magnetism induced in horizontal iron are independent of changes in the earth's force, and will be the same in all parts of the world. The quadrantal error is corrected by placing masses of soft iron on each side of the compass. As a rule, where a standard compass is placed in the center line of the ship, the iron is symmetrically placed on each side of the compass. In such cases the quadrantal error vanishes on the four cardinal points N., E., S., W., and attains a maximum easterly deviation at NE. and SW., and a maximum westerly deviation on NW. and SE. It is corrected by placing the soft iron on each side of the compass, in the thwart ship line. The soft iron may be in the form of iron chain, or cast-iron cylinders, as proposed by the Liverpool compass committee; or iron spheres, as used by Sir William Thomson. There is an ob

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jection to the use of chain, particularly when used with powerful compass needles; the links may become permanently magnetized from being too close to the ends of the needles. In some exceptional cases, when the iron is not symmetrical round the compass, we may also have a quadrantal error which has a maximum on the four cardinal points and vanishes on the four quadrantal points. This occurs in some of the turret ships, but it is so uncommon in ordinary ships, that it is not necessary to go fully into it now. It may be corrected by placing the soft iron on opposite sides of the compass, obliquely to the thwart ship line. In these exceptional cases there is usually a small constant error of the same name on all courses remaining, which must be allowed for.

Since the quadrantal error remains the same all over the world, and does not alter with time to any appreciable extent, it is very desirable to have it properly corrected at first. When it is properly corrected the readjustment of the steel magnets from time to time, as errors arise from change in the permanent magnetism of the ship, becomes very simple.

Hitherto I have only considered the case in which the ship is supposed to be upright, but when the ship heels over other influences come into action which produce errors, often of a very serious amount. The greatest errors from heeling occur in iron ships when they are upon northerly or southerly courses. When the ship's head is east or west there is no heeling error. In general with ships built in the northern hemisphere, the north point of the compass is drawn towards the high side of the ship while in northern latitudes. The error is usually greatest when the ship is built with her head in a northerly direction. In such ships the heeling error diminishes on going towards the southern hemisphere. With ships built in a southerly direction, if the compass be placed near the stern, the heeling error is usually small, and in some cases the north point is drawn to the low side of the ship. When the latter cases occur the heeling error will increase as the ship proceeds to the south. The heeling error may be corrected for any particular latitude by placing a magnet which is vertical when the ship is upright and becomes inclined to the vertical as the ship heels over under the center of the compass at such a height as to neutralize the ship's vertical force.

Although the compass on an iron ship may be accurately corrected at any particular time and place by the methods which I have briefly described, it would be a great mistake to suppose that the indications of the compass can be depended on for any length of time afterwards, without constantly ascertaining the errors by means of observations. In every ship, whether old or new, but especially in a new ship, during the first years, the only safe plan is to expect the errors to change, and never to lose an opportunity of checking the indications by observations of the sun by day and stars by night.

It cannot be too often impressed on those who have the charge of iron ships that the mariner's compass is no trustworthy guide, placed as it is in the midst of such changing forces as the magnetism of an iron ship. I have already referred to the changes which occur in the magnetism of new ships, and which may give rise to serious errors. No doubt the amount of change diminishes in time, and after some years the magnetism of the ship becomes to a certain extent constant, but it is always liable to alteration by shocks from the sea or other causes.

The only definite and scientific information which has been obtained regarding the changes in the magnetism of ships during the last thirty years has been supplied by the compass department of the British navy. An interesting paper has recently been given to the Royal Society by Captain Creak, F. R. S., on the deviations of the compasses of certain classes of Her Majesty's navy, in which he has recorded the magnetic history of a large number of iron armor-clad, iron, and composite ships. The tables which are appended to his paper show that after a few years' service the magnetism due to the hard iron becomes, to a very great extent, permanent, but I do not think that it would be safe to expect the same result with ships of the merchant service. The ships of the navy are constructed of much thicker plates than those of the merchant service, and we may suppose that the vibration from the engines, and shocks from the sea would have a greater effect in producing a change in the magnetism of the latter. Another reason for expecting the standard compasses to act more satisfactory in the ships of the navy is that the greatest care is exercised by the compass department in the selection of the best possible position for the standard compass with respect to the surrounding; whereas in the merchant service, in many cases, no precautions are taken for the selection of a good position for the standard compass.

I have now to refer to another part of the magnetism of the iron, which in many ships plays an important part, and gives rise to deviations which are frequently very puzzling to the navigator. This is called by some writers "retentive magnetism," but perhaps a better name for it is sluggishness of the ship's magnetism. It is the error which is found when a ship's course is changed after having been steaming in the same direction for some days. The error is also found after a ship has been lying in the dock for a considerable time. This is particularly observable in vessels trading

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between this country and North America. It frequently happens on the voyage from here to New York, after steaming for five or six days on a westerly course, when the vessel's head is turned to the north an error of several degrees of westerly deviation is found. On the other hand, after coming from New York to this country steering for several days on an easterly course, when the ship's head is turned to the north an error of several degrees of easterly deviation is found.

It may also be observed with ships going to India. After steaming along the Mediterranean in an easterly direction, when the ship's head is turned a south-westerly deviation is frequently found; but when coming home, after passing through the Mediterranean steering west, when the ship is turned to the north, west-erly deviation is found. If the ship be kept for a few days on the second course, the error will gradually diminish. The explanation of this is, that the ship requires some additional magnetism, which becomes temporarily fixed by the shaking from the screw and shocks from the waves. So long as the ship remains on the same course no deviation from this course is produced on the compass, but as soon as the course is altered the side of the ship which was farthest from the north having acquired a dose of blue magnetism attracts the north point of the compass, and produces the deviation observed. Now this magnetism, not being firmly fixed into the iron of the ship, is gradually shaken out when the ship is on another course. The amount of this error cannot be predicted at all. Captain Lecky has found it to amount, in some cases, to as much as 10 degrees, after steaming in an easterly or westerly direction for six or seven days. The following rules have been given by Sir William Thomson as a warn-ing regarding the sluggishness of ship's magnetism:

1. After steering for some time on westerly courses, expect westerly error if you turn to the north, or easterly error if you turn to the south.

2. After steering for some time on easterly courses, expect easterly error if you turn to the north, or westerly error if you turn to the south.

In conclusion, I may just give a few words of warning on a point of considerable im-portance in connection with the electric lighting of ships, and the action of the current of electricity on the ship's compasses. During the last few years many passenger steamers have been lighted with electricity, and often only a single wire is used, the ship's side taking the place of the return wire. Now, in such cases, it is quite possible that the wire may be placed in such a position and at such a distance from the compass that the current flowing through it will produce a large error. Take, as an example, a main lead from the dynamo machine, to light up a saloon of one hundred lamps or more. It may run along nearly underneath the position of the standard compass. The current may be taken at 100 ampères. In such a condition of affairs, the error produced on the compass will amount to as much as 7½ degrees when the wire is at a distance of 30 feet. Now this error will only be produced at the time that the current is flowing to light up the lamps, and it may never be detected by the officers of the ship. The observations for determining the error of the compass are usually made during the day, when the electric light is not required. The captain may, therefore, determine his compass error every day, and set his course quite correctly, but for some hours at night the ship may be going several degrees off her proper course, although she is being steered correctly by the compass.

This refers to a single wire system and a continuous current machine, but if an alternate current machine be used, no effect will be produced on the compass, even with a single wire, and the ship's side as a return. Also with a continuous current machine the danger may be entirely avoided by using a double-wire system with the two wires close together. It is essential that both wires should be well insulated from the ship's side. A want of insulation in one of the wires, although there may be no change observable in the lighting, may produce as much error on the compass as if there were only a single wire. So far as I know, there is no great advantage in the single-wire system over the double wire, except it be a slight saving in the first cost. It would, therefore, appear that for the safety of the ship, when a continuous current machine is used for lighting, two wires, well insulated, should always be employed, and that the insulation of the wires should be tested periodically to make certain that no fault has occurred.

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APPENDIX No. 5.

COLORS OF FLAGS IN THE INTERNATIONAL CODE OF SIGNALS.

[Translated from the Spanish in the Revista de Marina, Madrid.]

While I was still following the sea in my profession of pilot in the merchant marine, I was surprised to see what, in my humble opinion, is lack of ingenuity in the arrangement of the colors of the flags of the telegraphic code then most in use, which was known by the name of Marryat, and the same, if not worse, in the French Code of Reynold. Indeed, both codes used for the flags the colors red, blue, yellow, and white, arranged in beautiful combinations of stripes, checks, hour-glasses, diagonals, &c., so that on looking at the plate of telegraphic flags it appears that more attention has been paid to good taste in design and color than to the requirements of ready visibility.

At the time to which I refer very little had been published concerning the optical defect known as *Daltonism*, and the author of these lines confesses that then he had no more notion of this defect of vision than the little that is explained in Gonat's Treatise on Physics, but he remembers having held and heard held aboard ship great disputes over the determination of telegraphic flags at a distance, the red being confounded with blue, and both these colors in old bunting with yellow and with white. It is easy to understand such confusion, knowing that the colors of bunting lose their brightness with time, and the light also, according to its direction and brightness, favors more or less the clear visibility of the flags.

The distinguished Spanish sailor, Don Pedro de Pride, in his code of telegraphic flags, introduced greater simplicity in the arrangement of the colors, giving preference to the flags of a single color and two colors in well defined figures, or equal diagonal divisions. Strange that he should not fully carry out so excellent a system, and not have to go back to the combinations of colors of the flags 9 and 10 and the pennants *A* and *B*. Then came the international code of signals now in use with the old chromatic confusion of Marryat and Reynold and their intricate devices, increasing the chances of error by increasing the number of flags.

Apart from my own conviction, I am moved to scribble these lines by the increased number of complaints against the existing code that I have received from many and distinguished seamen, who have found it defective in respect to the visibility of the flags. However light the wind to flutter the bunting—and all the more if it is faded—it is difficult to make out the signals M, V, W, R, N, and Y with the promptness required by the operation of telegraphing, especially between steamships.

It is well known that there are as a last resort the colorless signals for long distances, but this method has the immense disadvantage of having to spell out the words, which is almost impracticable for two vessels moving in opposite directions. Moreover, it is to be borne in mind that the sailors must be given simplicity, not cumbersome operations. There is no doubt that the international code is very complete, since it includes 78,642 distinct signals. But what necessity has the merchant marine for this increased number of signs? And if, under protest, we admit this necessity, why increase the number of flags to 213? With only 10 flags, we have 90 binary permutations; 720 ternary; 5,040 quarternary.

Admitting three distinctive pennants hoisted above, below, and between the foregoing binary and ternary permutations, we have 2,430 new signs, and 17,550 others by hoisting each one of the three pennants to the top of another mast. We have in all 25,830 signs, enough for the requirements of navigation.

For the signal numbers of the vessels of each nation these same signs could be used, having the national flag hoisted as a distinction.

Let not the readers of this celebrated review suppose that it is my intention to claim that the existing code, approved and followed by the merchant marines of all nations, is to be condemned solely on these suggestions—the offspring, perhaps, of the greatest ignorance. No; the final object that I propose to myself is, admitting, as there

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is now no escape from admitting, the number of 21 flags of the existing international code to devise a way of substituting for the present very complicated devices and colors, others more simple and more easily seen. Though I am convinced that these lines will pass unnoticed, I doubt not that sooner or later the theme I am so poorly discussing will be thrust upon us by the many complaints of seamen. In my opinion the substitution is easy.

In the first place I eliminate all the colors except white and black by reason of the ease with which they may be mistaken, owing to being faded, to *Daltonism*, lack of light, &c. White and black are two contrasted colors, *exact opposites*; the former is light, the latter the negative of light. However much the black part of the flag may be faded it will always be distinguished from the white part, especially if it be arranged that the flags shall never terminate in white, since at a distance it cannot be made out because it is confounded with the blue background of the sky, and even more if the atmosphere is charged with fog, in which case the blue background becomes changed into white.

In the accompanying plate I give a combination of devices for 21 flags with only the colors white and black, which could be used instead of those of the present code without thereby changing in any respect the signals.

I shall be satisfied if by these lines I succeed in inviting to this maritime problem the attention of some distinguished fellow-mariner who will discuss it from greater wealth of knowledge.

JOSÉ RECART GIRALT.

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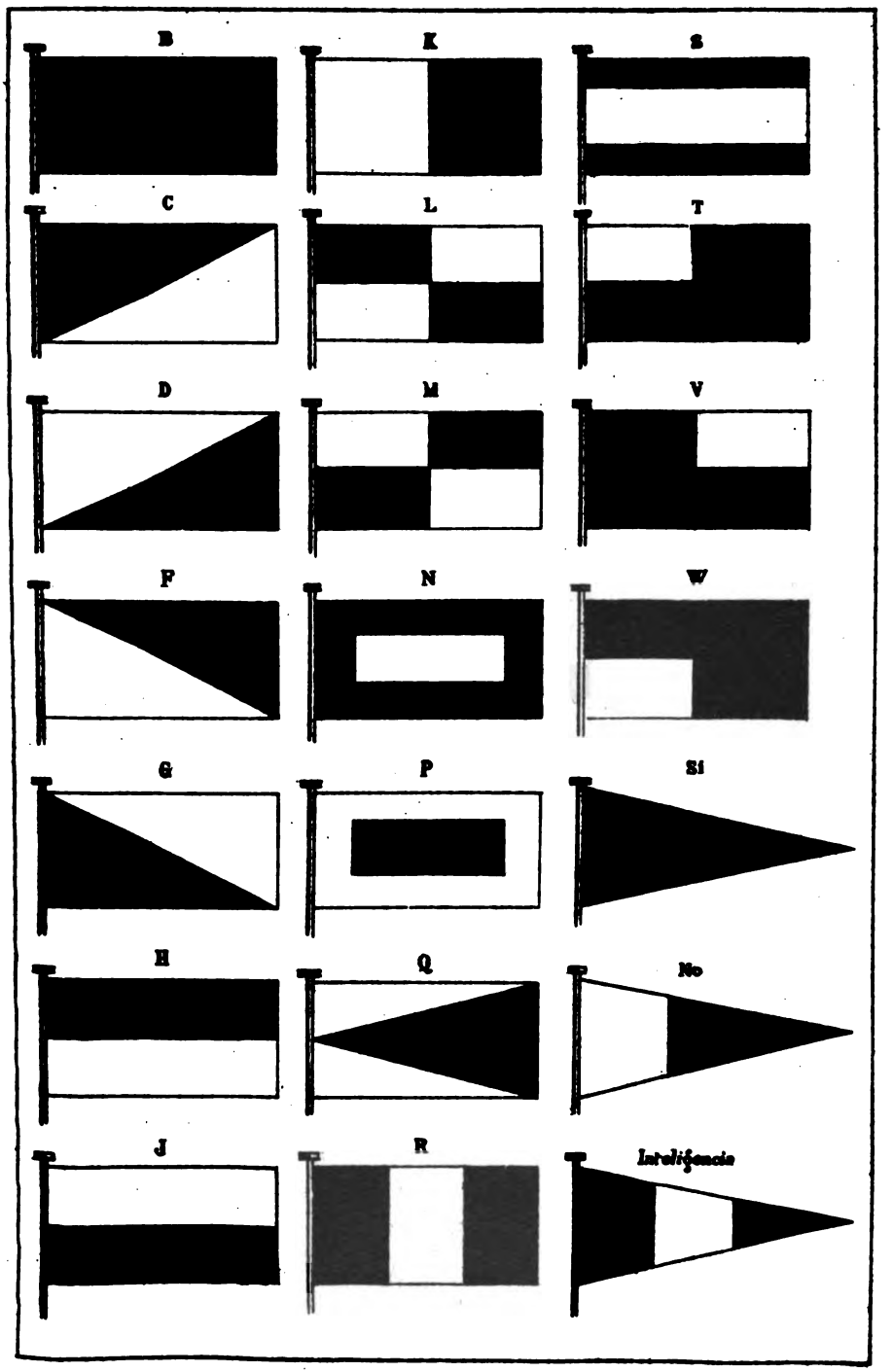

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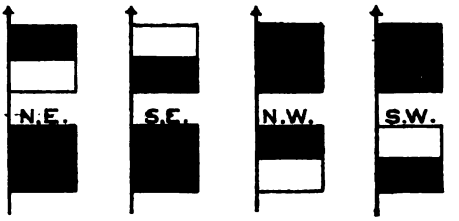
WIND—DIRECTION AND VELOCITY SIGNALS.



I. Direction Signal above Cautionary Signal when Easterly winds are expected; and below for Westerly winds.

II. Black stripe above White when Northerly winds are expected; and below for Southerly winds.

III. Cautionary Flag hoisted alone indicates the probable direction of wind is doubtful.

IV. A Red Light at night represents the Cautionary Signal.

There is no night signal for wind direction.

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APPENDIX No. 6.

REVISED INTERNATIONAL REGULATIONS FOR PREVENTING COLLISIONS AT SEA.

PRELIMINARY.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the following "Revised International Rules and Regulations for Preventing Collisions at Sea" shall be followed in the navigation of all public and private vessels of the United States upon the high seas and in all coast waters of the United States, except such as are otherwise provided for, namely:

STEAM AND SAIL VESSELS.

ARTICLE 1. *In the following rules* every *steamship* which is under sail and not under steam *is to* be considered a *sailing ship*, and every *steamship* which is under steam, whether under sail or not, *is to* be considered a *ship under steam.*

LIGHTS.

ART. 2. The lights mentioned in the following *articles numbered three, four, five, six, seven, eight, nine, ten, and eleven*, and no others, shall be carried in all weathers, *from* sunset *to* sunrise:

LIGHTS FOR STEAMERS.

ART. 3. *A sea-going steamship*, when under way, shall carry—

(*a*) *On or in front of the foremast, at a height above the hull of not less than twenty feet, and if the breadth of the ship exceeds twenty feet, then at a height above the hull not less than such breadth*, a bright white light, so constructed as to show a uniform and unbroken light over an arc of the horizon of twenty points of the compass, so fixed as to throw the light ten points on each side of the ship, namely, from right ahead to two points abaft the beam on either side, and of such a character as to be visible on a dark night, with a clear atmosphere, at a distance of at least five miles.

(*b*) On the starboard side a green light, so constructed as to show a uniform and unbroken light over an arc of the horizon of ten points of the compass, so fixed as to throw the light from right ahead to two points abaft the beam on the starboard side, and of such a character as to be visible on a dark night, with a clear atmosphere, at a distance of at least two miles.

(*c*) On the port side a red light, so constructed as to show a uniform and unbroken light over an arc of the horizon of ten points of the compass, so fixed as to throw the light from right ahead to two points abaft the beam on the port side, and of such a character as to be visible on a dark night, with a clear atmosphere, at a distance of at least two miles.

(*d*) The *said* green and red *side*-lights shall be fitted with inboard screens projecting at least three feet forward from the light, so as to prevent *these lights* from being seen across the bow.

LIGHTS FOR TOWING-STEAMERS.

ART. 4. *A steamship* when towing *another ship* shall, *in addition to her side-lights*, carry two bright white lights *in a vertical line, one over the other, not less than three feet apart*, so as to distinguish *her* from other *steamships*. Each of these lights shall be of the same construction and character, *and shall be carried in the same position*, as the *white light which other steamships are required to carry.*

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VESSELS NOT UNDER COMMAND.

ART. 5. (*a*) *A ship, whether a steamship or sailing ship, which from any accident is not under command, shall at night carry, in the same position as the white light which steamships are required to carry, and if a steamship, in place of that light, three red lights in globular lanterns, each not less than ten inches in diameter, in a vertical line, one over the other, not less than three feet apart, and of such a character as to be visible on a dark night, with a clear atmosphere, at a distance of at least two miles, and shall by day carry in a vertical line, one orer the other, not less than three feet apart, in front of but not lower than her foremast-head, three black balls or shapes, each two feet in diameter.*

VESSELS LAYING TELEGRAPH CABLES.

(*b*) *A ship, whether a steamship or sailing ship, employed in laying or in picking up a telegraph cable, shall at night carry, in the same position as the white light which steamships are required to carry, and if a steamship, in place of that light, three lights in globular lanterns, each not less than ten inches in diameter, in a vertical line, over one another, not less than six feet apart. The highest and lowest of these lights shall be red, and the middle light shall be white, and they shall be of such a character that the red lights shall be visible at the same distance as the white light. By day she shall carry, in a vertical line, one over the other, not less than six feet apart, in front of but not lower than her foremast-head, three shapes not less than two feet in diameter, of which the top and bottom shall be globular in shape and red in color, and the middle one diamond in shape and white.*

WHEN TO CARRY SIDE-LIGHTS.

(*c*) *The ships referred to in this article, when not making any way through the water, shall not carry the side-lights, but when making way shall carry them.*

(*d*) *The lights and shapes required to be shown by this article are to be taken by other ships as signals that the ship showing them is not under command, and cannot therefore get out of the way. The signals to be made by ships in distress and requiring assistance are contained in article twenty-seven.*

LIGHTS FOR SAILING VESSELS.

ART. 6. *A sailing ship* under way or being towed shall carry the same lights as *are provided by article three for* a steamship under way, with the exception of the white light, which *she* shall never carry.

EXCEPTIONAL LIGHTS FOR SMALL VESSELS.

ART. 7. Whenever, as in *the* case of small vessels during bad weather, the green and red side-lights cannot be fixed, these lights shall be kept on deck, on their respective sides of the vessel, ready for *use*, and shall, on the approach of or to other vessels, be exhibited on their respective sides in sufficient time to prevent collision, in such manner as to make them *most* visible, and so that the green light shall not be seen on the port side nor the red light on the starboard side. To make the use of these portable lights more certain and easy, *the lanterns containing them* shall each be painted outside with the color of the light they respectively contain, and shall be provided with *proper* screens.

LIGHTS FOR STEAM VESSELS AND SAILING VESSELS AT ANCHOR.

ART. 8. *A ship*, whether *a steamship* or *a sailing ship*, when at anchor, shall *carry*, where it can best be seen, but at a height not exceeding twenty feet above the hull, a white light, in a globular lantern of *not less than* eight inches in diameter, and so constructed as to show a clear, uniform, and unbroken light, visible all round the horizon at a distance of at least one mile.

LIGHTS FOR PILOT VESSELS.

ART. 9. *A pilot vessel, when engaged on her station on pilotage duty*, shall not carry the lights required for other vessels, but shall carry a white light at the masthead, visible all *round* the horizon, and shall also exhibit a flare-up light *or* (*a*) *flare-up lights at short intervals, which shall never exceed* fifteen minutes. *A pilot vessel, when not engaged on her station on pilotage duty, shall carry lights similar to those of other ships.*

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LIGHTS FOR OPEN BOATS AND FISHING VESSELS.

ART. 10. Open boats *and fishing-vessels of less than twenty tons net registered tonnage, when under way and when not having their nets, trawls, dredges, or lines in the water,* shall not *be obliged* to carry the *colored* side-lights; but *every such boat and vessel* shall *in lieu thereof have ready at hand* a lantern *with* a green *glass* on the one side and a red *glass* on the other side, and on *approaching* or *being approached by another* vessel such lantern shall be exhibited in sufficient time to prevent collision, *so* that the green light shall not be seen on the port side nor the red light on the starboard side.

The following portion of this article applies only to fishing vessels and boats when in the sea off the coast of Europe lying north of Cape Finisterre:

(*a*) *All fishing vessels and fishing boats of twenty tons net registered tonnage or upward, when under way and when not having their nets, trawls, dredges, or lines in the water, shall carry and show the same lights as other vessels under way.*

(*b*) *All vessels when engaged in fishing with drift-nets shall exhibit two white lights from any part of the vessel where they can be best seen. Such lights shall be placed so that the vertical distance between them shall be not less than six feet and not more than ten feet, and so that the horizontal distance between them, measured in a line with the keel of the vessel, shall be not less than five feet and not more than ten feet. The lower of these two lights shall be the more forward, and both of them shall be of such a character and contained in lanterns of such construction as to show all round the horizon, on a dark night, with a clear atmosphere, for a distance of not less than three miles.*

(*c*) *All vessels when trawling, dredging, or fishing with any kind of drag-nets shall exhibit, from some part of the vessel where they can be best seen, two lights. One of these lights shall be red and the other shall be white. The red light shall be above the white light, and shall be at a vertical distance from it of not less than six feet and not more than twelve feet; and the horizontal distance between them, if any, shall not be more than ten feet. These two lights shall be of such a character and contained in lanterns of such construction as to be visible all round the horizon, on a dark night, with a clear atmosphere, the white light to a distance of not less than three miles and the red light of not less than two miles.*

(*d*) *A vessel employed in line-fishing, with her lines out, shall carry the same lights as a vessel when engaged in fishing with drift-nets.*

(*e*) *If a vessel, when fishing with a trawl, dredge, or any kind of drag-net, becomes stationary in consequence of her gear getting fast to a rock or other obstruction, she shall show the light and make the fog-signal for a vessel at anchor.*

(*f*) *Fishing vessels and open boats may at any time use a flare-up in addition to the lights which they are by this article required to carry and show. All flare-up lights exhibited by a vessel when trawling, dredging, or fishing with any kind of drag-net shall be shown at the after part of the vessel, excepting that if the vessel is hanging by the stern to her trawl, dredge, or drag-net they shall be exhibited from the bow.*

(*g*) *Every fishing vessel and every open boat when at anchor between sunset and sunrise shall exhibit a white light, visible all round the horizon at a distance of at least one mile.*

(*h*) *In a fog a drift-net vessel attached to her nets, and a vessel when trawling, dredging, or fishing with any kind of drag-net, and a vessel employed in line-fishing with her lines out, shall, at intervals of not more than two minutes, make a blast with her fog-horn and ring her bell alternately.*

VESSELS BEING OVERTAKEN.

ART. 11. *A ship which is being overtaken by another shall show from her stern to such last-mentioned ship a white light or a flare-up light.*

SOUND SIGNALS FOR FOG, &C.

ART. 12. *A steamship shall be provided with a steam-whistle or other efficient steam-sound signals, so placed that the sound may not be intercepted by any obstructions, and with an efficient fog-horn, to be sounded by a bellows or other mechanical means, and also with an efficient bell. (In all cases where the regulations require a bell to be used, a drum will be substituted on board Turkish vessels.) A sailing ship shall be provided with a similar fog-horn and bell.*

In fog, mist, or falling snow, whether by day or night, the signals described in this article shall be used as follows, that is to say:

(*a*) *A steamship under way shall make with her steam-whistle or other steam-sound signal, at intervals of not more than two minutes, a prolonged blast.*

(*b*) *A sailing ship under way shall make with her fog-horn, at intervals of not more than two minutes, when on the starboard tack one blast, when on the port tack two blasts in succession, and when with the wind abaft the beam three blasts in succession.*

(*c*) *A steamship and a sailing ship when not under way shall, at intervals of not more than two minutes, ring the bell.*

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SPEED OF SHIPS TO BE MODERATE IN FOG, &C.

ART. 13. *Every ship, whether a sailing ship or a steamship, shall, in a fog, mist, or falling snow, go at a moderate speed.*

STEERING AND SAILING RULES.

SAILING VESSELS.

ART. 14. *When two sailing ships are approaching one another so as to involve risk of collision, one of them shall keep out of the way of the other as follows, namely:*

(a) *A ship which is running free shall keep out of the way of a ship which is close-hauled.*

(b) *A ship which is close-hauled on the port tack shall keep out of the way of a ship which is close-hauled on the starboard tack.*

(c) *When both are running free, with the wind on different sides, the ship which has the wind on the port side shall keep out of the way of the other.*

(d) *When both are running free, with the wind on the same side, the ship which is to windward shall keep out of the way of the ship which is to leeward.*

(e) *A ship which has the wind aft shall keep out of the way of the other ship.*

STEAM VESSELS MEETING.

ART. 15. If two *ships* under steam are meeting end on, or nearly end on, so as to involve risk of collision, *each shall alter her course to starboard*, so that each may pass on the port side of the other.

This article only applies to cases where ships are meeting end on, or nearly end on, in such a manner as to involve risk of collision, and does not apply to two ships which must, if both keep on their respective courses, pass clear of each other.

The only cases to which it does apply are when each of the two ships is end on, or nearly end on, to the other; in other words, to cases in which by day each ship sees the masts of the other in a line, or nearly in a line, with her own, and by night to cases in which each ship is in such a position as to see both the side lights of the other.

It does not apply by day to cases in which a ship sees another ahead crossing her own course, or by night to cases where the red light of one ship is opposed to the red light of the other, or where the green light of one ship is opposed to the green light of the other, or where a red light without a green light, or a green light without a red light, is seen ahead, or where both green and red lights are seen anywhere but ahead.

TWO STEAMERS CROSSING.

ART. 16. If two *ships* under steam are crossing so as to involve risk of collision, the *ship* which has the other on her own starboard side shall keep out of the way of the other.

STEAMSHIPS TO KEEP OUT OF WAY OF SAILING VESSEL.

ART. 17. If two *ships*, one of which is a *sailing ship* and the other a *steamship*, are proceeding in such directions as to involve risk of collision, the *steamship* shall keep out of the way of the *sailing ship*.

STEAM VESSEL APPROACHING ANOTHER VESSEL.

ART. 18. Every *steamship*, when approaching another *ship* so as to involve risk of collision, shall slacken her speed, or stop and reverse, if necessary.

SIGNALS OF STEAMERS SHOWING COURSE.

ART. 18. *In taking any course authorized or required by these regulations, a steamship under way may indicate that course to any other ship which she has in sight by the following signals on her steam-whistle, namely:*

One short blast to mean "I am directing my course to starboard."

Two short blasts to mean "I am directing my course to port."

Three short blasts to mean "I am going full speed astern."

The use of these signals is optional, but if they are used the course of the ship must be in accordance with the signal made.

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COLLISION DIAGRAMS

DESIGNED TO ILLUSTRATE

THE REVISED INTERNATIONAL REGULATIONS

FOR

PREVENTING COLLISIONS AT SEA.

(The arrows show the direction of wind.)

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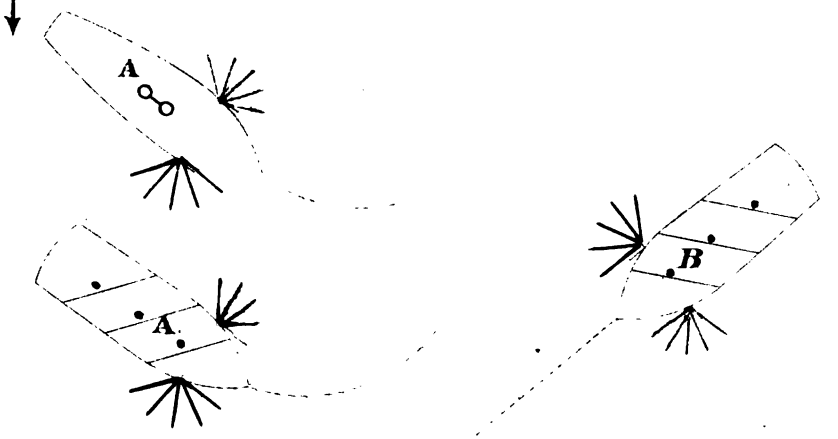
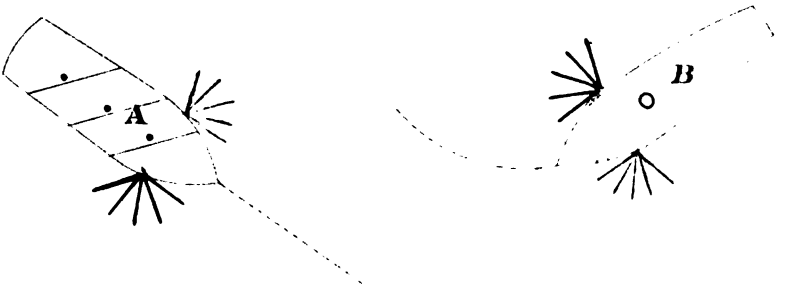
Position 1.

Having the wind free on the port side A. must keep out of the way of B. who having the wind on the starboard side has the right of way



But if B. is a steamer she must keep clear of A. which being a sailing vessel has the right of way. Both vessels being steamers Article 16 would apply, the ship having the other on her own starboard hand (B) being bound to give way.



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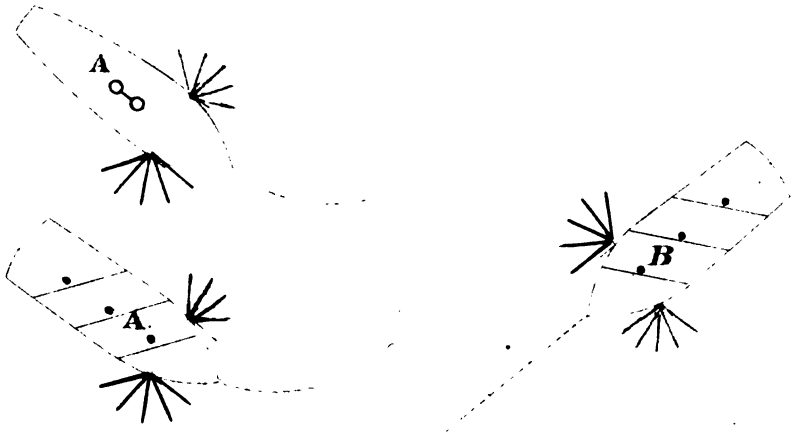
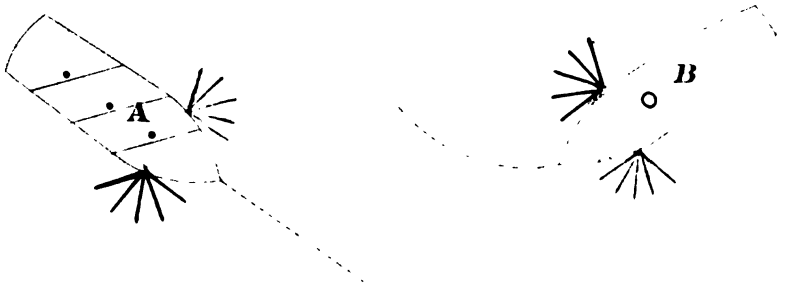
Position 1.

Having the wind free on the port side A. must keep out of the way of B. who having the wind on the starboard side has the right of way



But if B. is a steamer she must keep clear of A. which being a sailing vessel has the right of way. Both vessels being steamers Article 16 would apply; the ship having the other on her own starboard hand (B) being bound to give way.



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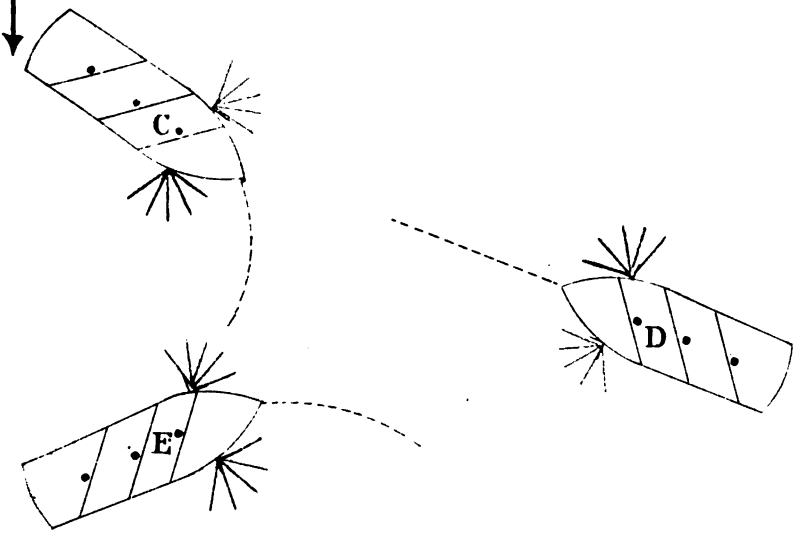
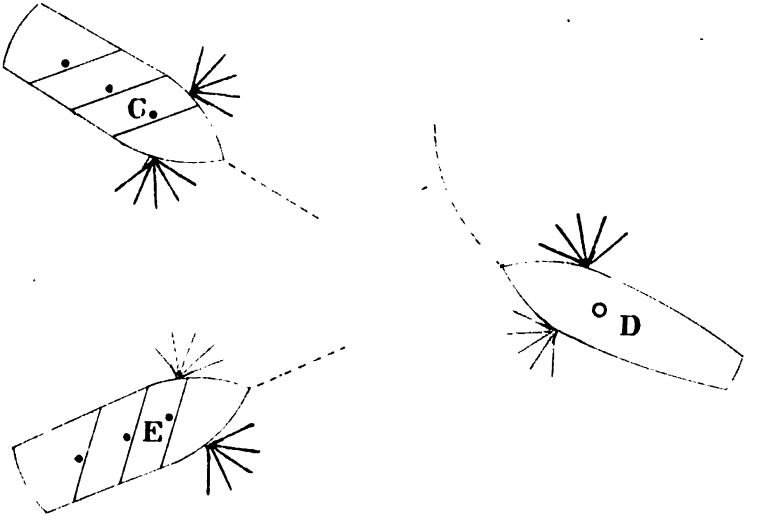
Position 2.

As C. and D. are meeting end on both must port helm if possible, but if one going free is crossing the track of E. close hauled then C. must keep out of the way.



But if D is a steamer she must port helm to keep clear of C. or E. which being sailing vessels continue their courses

In case of C. and D. being both steamers meeting end on Article 15 would apply, each vessel porting to pass on the port side of the other.



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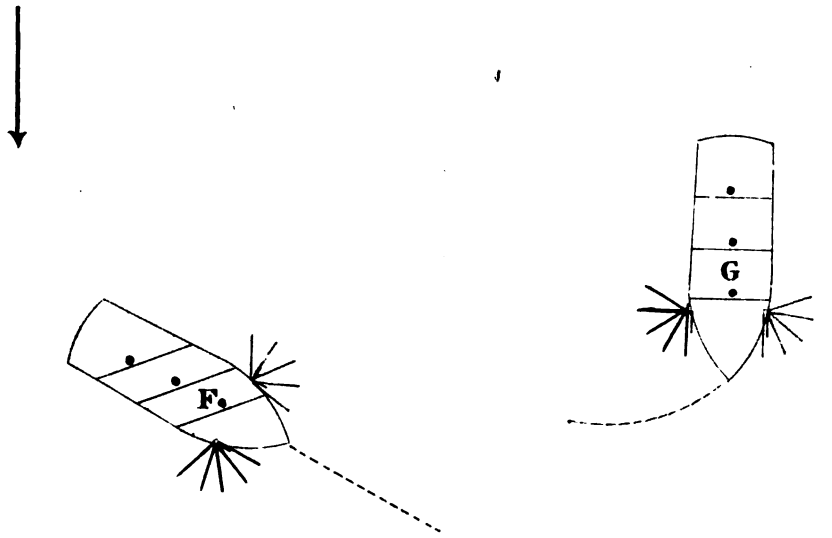
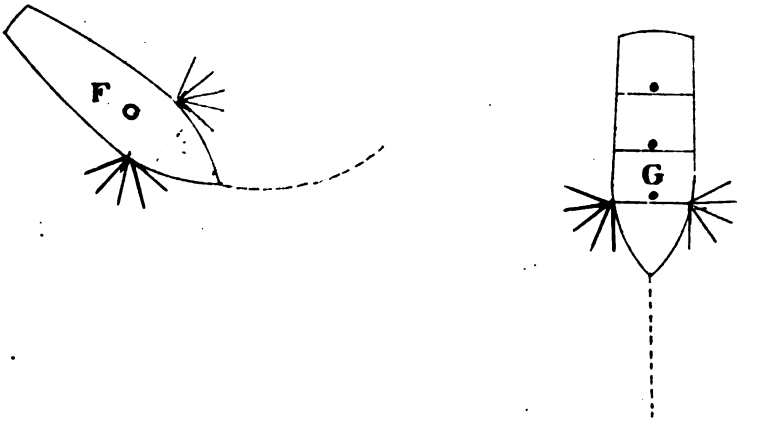
Position 3.

As G. *has the wind aft and meets* F. *running free with the wind on the port side, she must keep clear.* (see Article 14)



Both vessels being steamers the same course should be followed (see Article 15) *but if* F *is a steamer and* G *is a sailer the latter has the right of way and* F *must keep clear.*



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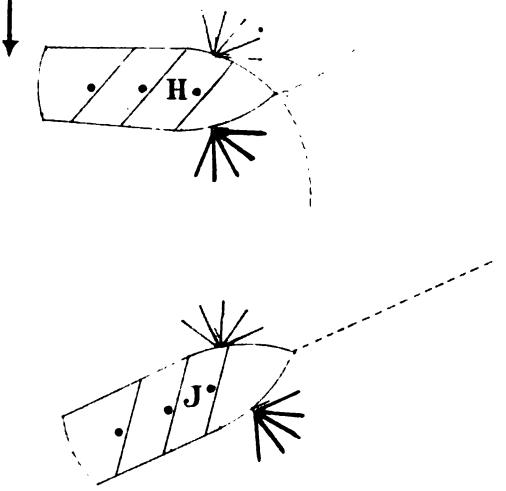
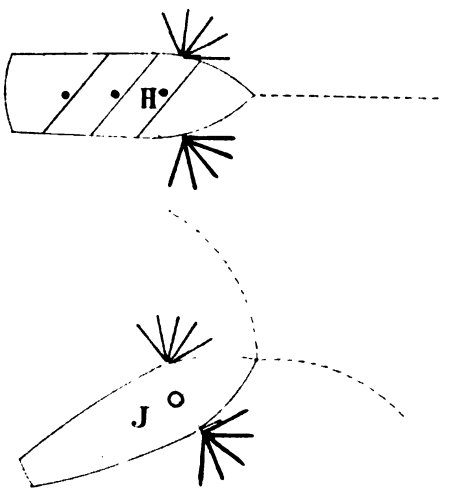
Position 4.

Both H. *and* J. *sailing with the wind on the port side,* H. *being to windward keeps clear of* J.



The same rule is observed in case both vessels are steamers (see Article 16.) *or in case* H. *is a steamer and* J. *is a sailer but if* H. *is a sailer and* J. *is a steamer then* J. *must keep clear.* (see Article 17.)



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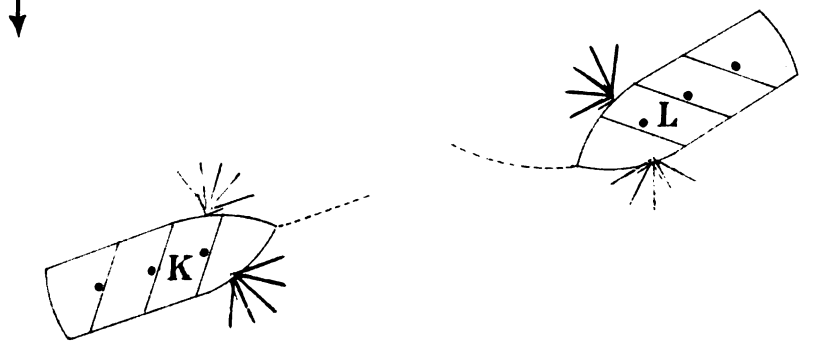
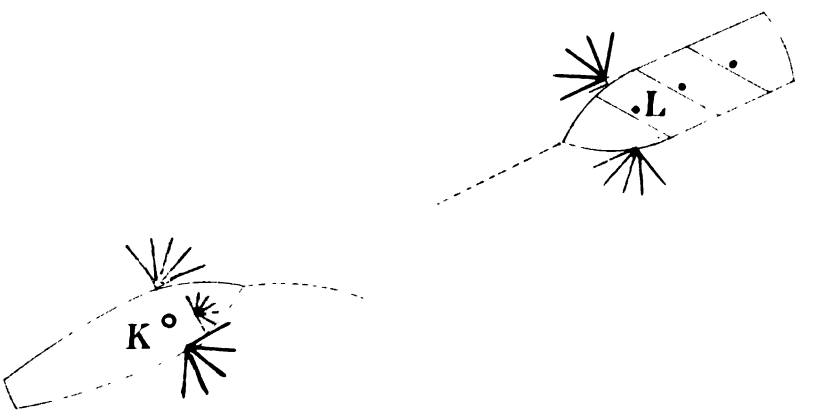
Position 5.

As **K.** *and* **L.** *must end on, both must port the helm. the one running free by luffing, and the one close hauled by keeping away if necessary.*



With two steamers the same rule of Port Helm obtains, but if **K.** *is a steamer and* **L.** *a sailer the latter has the right of way and* **K.** *must keep clear. (Article 17)*



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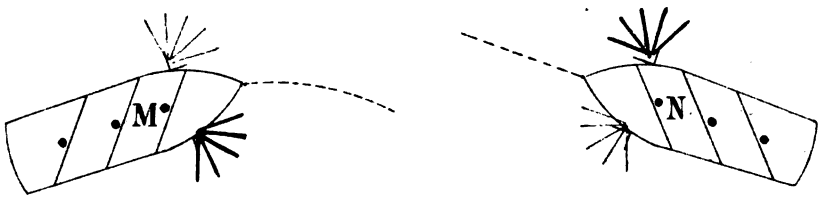
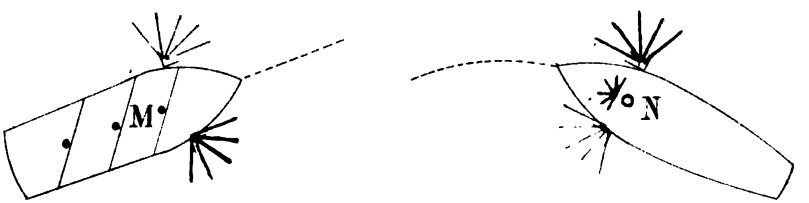
Position 6.

Two sailing ships meeting closehauled **M.** *the one on the port tack, must keep clear of* **N.** *on the starboard tack, who has the right of way: see Article 14*



The rule of port helm prevails in case both vessels are steamers, or in case **M.** *is a steamer only. but if* **N.** *is a steamer and* **M.** *a sailer the latter must hold her course it being the duty of* **N.** *to keep clear.*



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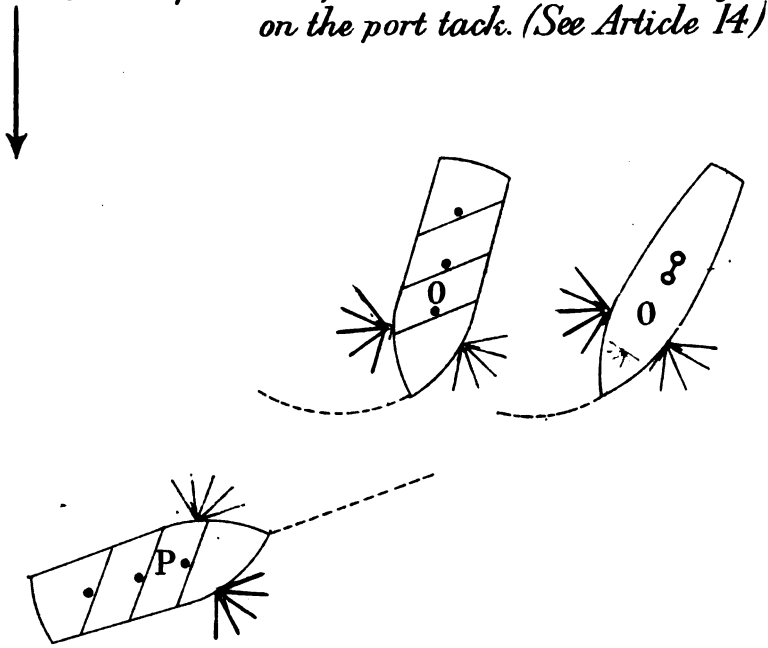
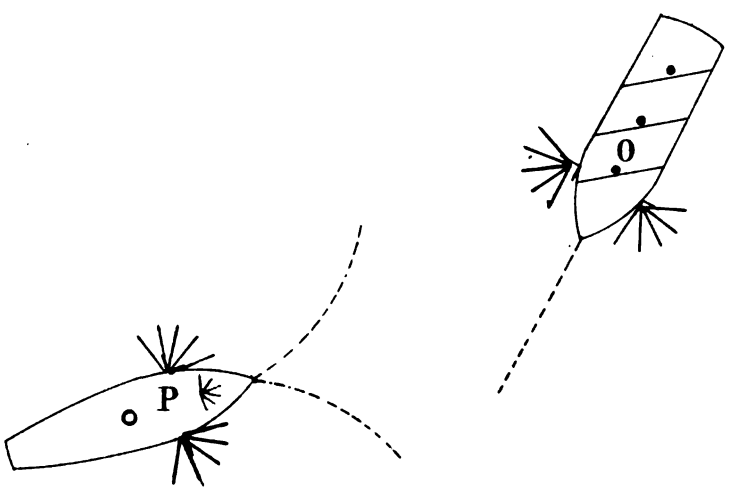
Position 7.

As 0. *is running with the wind aft she must keep clear of* P. *closehauled although on the port tack. (See Article 14)*



But if P. *is a steamer she must change her course to keep clear of* 0. *who being a sailer keeps her course. Both ships being steamers Article 15. should be followed.*



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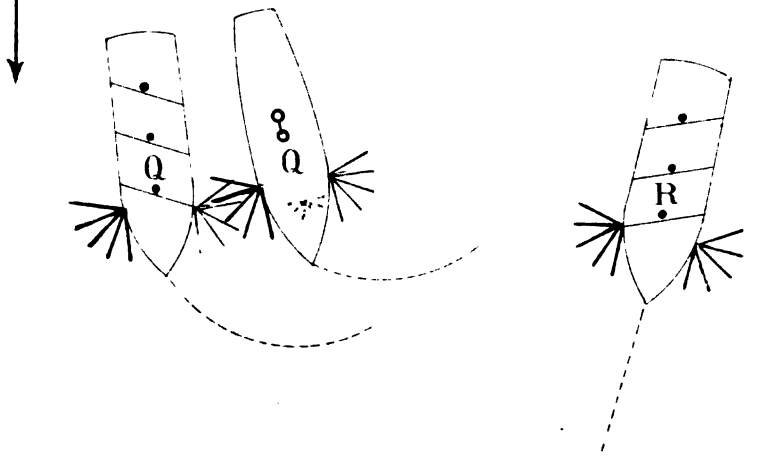
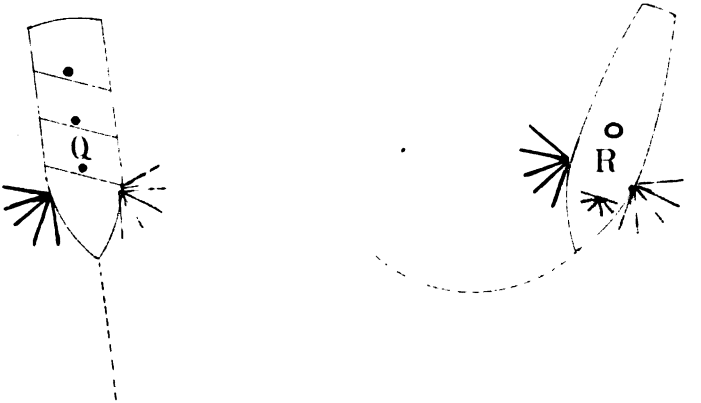
Position 8.

As Q. has the wind nearly aft she must keep clear of R. *who is running free with the wind on the starboard side*



But if R. *is a steamer and* Q. *is under canvas it is the duty of* R. *to keep clear. Providing both are steamers it is the duty of* R. *to keep clear according to Article 16.*



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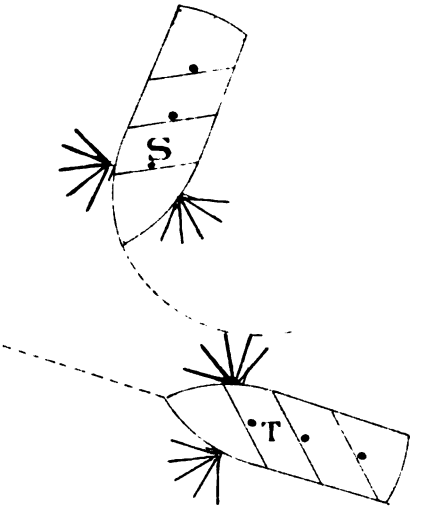
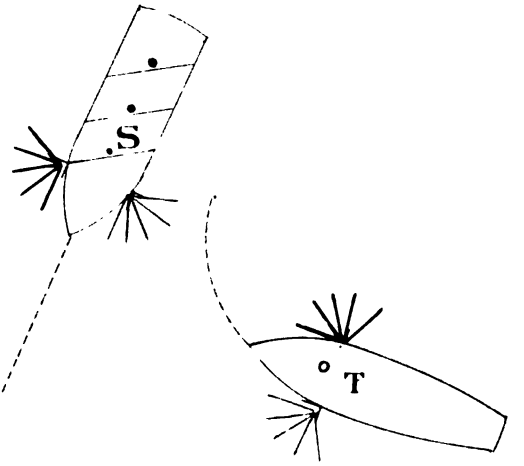
Position 9.

As both ships are sailing with the wind on the same side the ship that is to windward S must keep clear of T to leward.



If T is a steamer and S is a sailing Vessel, the former must keep clear. If both are steamers T having S to starboard keeps clear. (Article 16)



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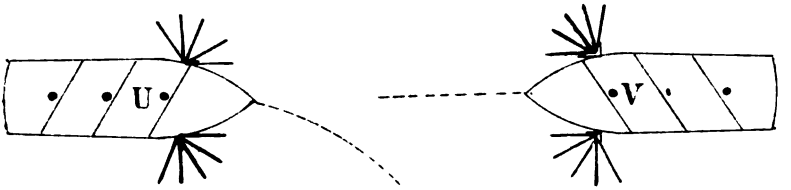
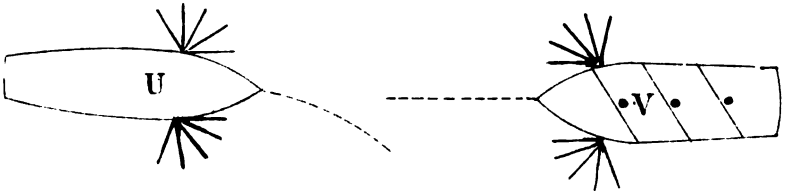
Position 10.

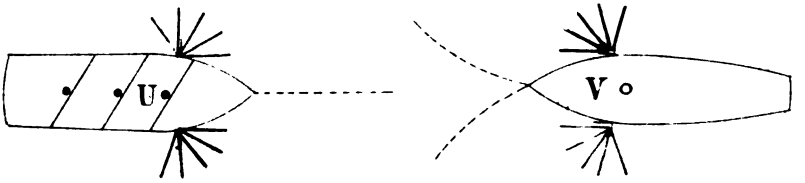
Two sailing ships meeting end on with the wind abeam U having the wind on the port side keeps clear of V who is on the star board tack. (Article 14)



In case of two steamers both port the helm and pass on the port side of each other.- (Article 15)



In case V is a steamer and U is a sailer, the former must keep clear. (Article 17)



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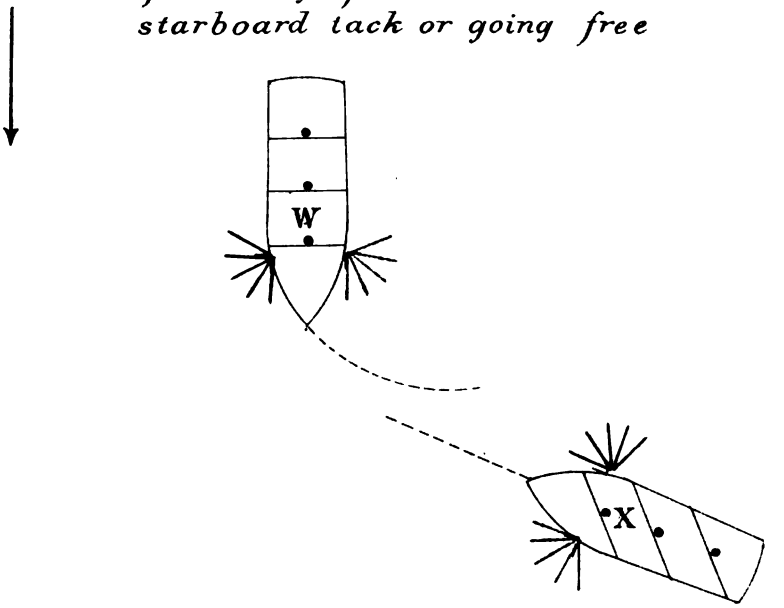
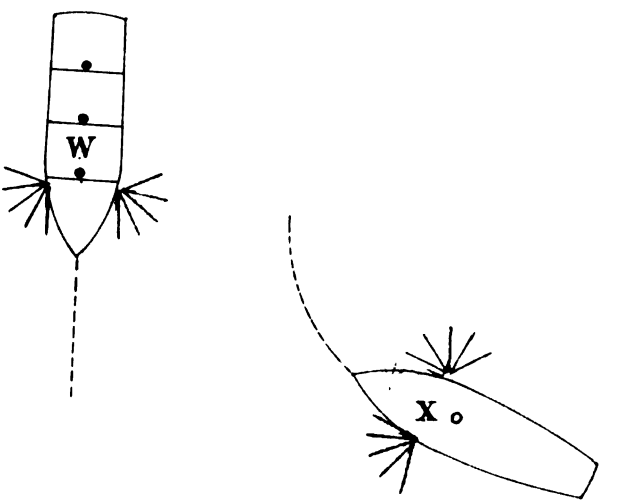
Position 11.

As W has the wind aft she must keep out of the way of X closehauled on the starboard tack or going free



With two steamers the rule is for the one having the other on her own starboard side to keep clear.- But W being under sail and X a steamer W must hold her course while X must keep clear.



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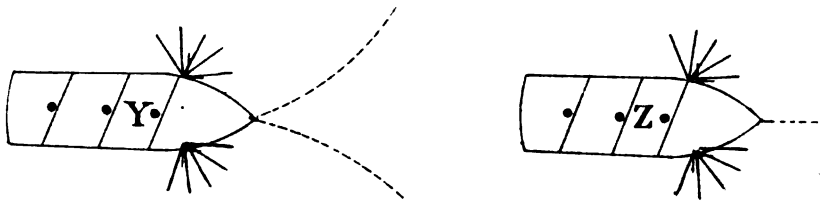
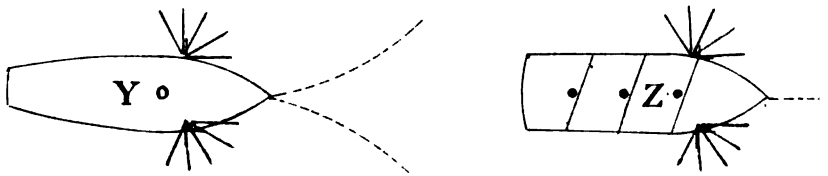
Position 12.

Every vessel overtaking another is to keep out of the way. (Article 20) The overtaken ship shows a bright light aft when she sees the side lights of the one astern.



In case of a sailing Vessel Z being overtaken by a steamer Y the same rule prevails Also a steamer overtaking another has to keep clear.-



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VESSEL OVERTAKING ANOTHER.

ART. 20. *Notwithstanding anything contained in any preceding article,* every *ship, whether a sailing ship or a steamship,* overtaking *any other* shall keep out of the way of the *overtaken ship.*

STEAMER IN NARROW CHANNEL.

ART. 21. *In narrow channels every steamship shall, when it is safe and practicable, keep to that side of the fairway or mid-channel which lies on the starboard side of such ship.*

RIGHT OF WAY.

ART. 22. *Where by the above* rules one of two *ships is to* keep out of the way, the other shall keep her course.

SPECIAL CIRCUMSTANCES AND DANGERS.

ART. 23. In obeying and construing these rules due regard *shall* be had to all dangers of navigation, and to any special circumstances which may *render* a departure from the *above rules* necessary in order to avoid immediate danger.

NO SHIP UNDER ANY CIRCUMSTANCES TO NEGLECT PROPER PRECAUTIONS.

ART. 24. *Nothing in these rules shall exonerate any ship, or the owner, or master, or crew thereof, from the consequences of any neglect to carry lights or signals, or of any neglect to keep a proper lookout, or of the neglect of any precaution which may be required by the ordinary practice of seamen or by the special circumstances of the case.*

RESERVATION OF RULES FOR HARBOR AND INLAND NAVIGATION.

ART. 25. *Nothing in these rules shall interfere with the operation of a special rule, duly made by local authority, relative to the navigation of any harbor, river, or inland navigation.*

SPECIAL LIGHTS FOR SQUADRONS AND CONVOYS.

ART 26. *Nothing in these rules shall interfere with the operation of any special rules made by the Government of any nation with respect to additional station and signal lights for two or more ships of war or for ships sailing under convoy.*

DISTRESS-SIGNALS.

ART. 27. *When a ship is in distress and requires assistance from other ships or from the shore, the following shall be the signals to be used or displayed by her, either together or separately, that is to say:*

In the day-time—

1. *A gun fired at intervals of about a minute.*
2. *The international code signal of distress indicated by N. C.*
3. *The distant signal, consisting of a square flag, having either above or below it a ball, or anything resembling a ball.*

At night—

1. *A gun fired at intervals of about a minute.*
2. *Flames on the ship (as from a burning tar-barrel, oil-barrel, and so forth).*
3. *Rockets or shells, throwing stars of any color or description, fired one at a time, at short intervals.*

REPEALING CLAUSE.

SEC. 2. That all laws and parts of laws inconsistent with the foregoing "Revised International Rules and Regulations" for the navigation of all public and private vessels of the United States upon the high seas and in all coast waters of the United States, are hereby repealed, except as to the navigation of such vessels within the harbors, lakes, and inland waters of the United States; and that this act shall take effect and be in force from and after the first day of September, anno Domini eighteen hundred and eighty-four.

Approved, March 3, 1885.

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APPENDIX No. 7.

DIAGRAMS

Illustrating the dangers of the modern rule of the road as applying to steamers.

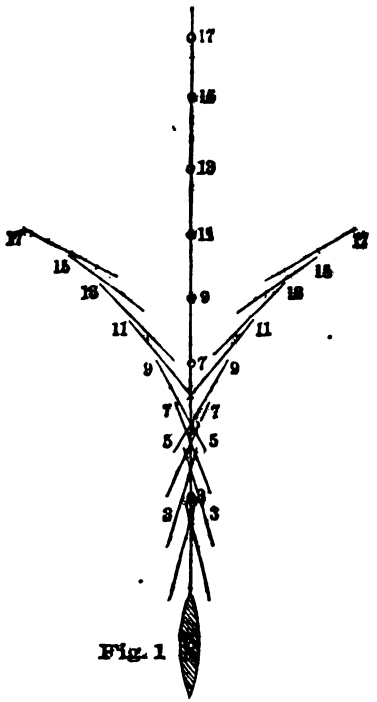

Fig. 1

This diagram represents the positions, taken five seconds apart, assumed by a ship of 9,000 tons moving at the rate of 12 knots on the straight, and with a helm angle of 34 degrees when hard over. If the vessel went at less speed her curves, with the same amount of helm, would be substantially the same. If she had 9 knots speed, her advance, after the turn begins, would be about 75 per cent. of that shown in the figure; her transfer 80 per cent. If she had a speed of 6 knots her advance would be about 50 per cent. of that shown in the figure, and her transfer 60 per cent.

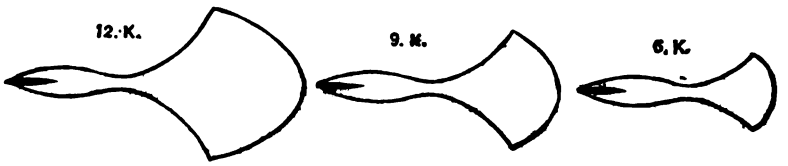

Fig. 2

Here are three diagrams which show comparatively the areas occupied by vessels of the same size moving on a straight at the rates of 12, 9, and 6 knots. It will be ob-

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served that, no matter what the vessels may do with their helms or engines during eighty-five seconds, each ship will be somewhere within the line bounding the figure representing her maneuvering power. This is termed her maneuvering area.

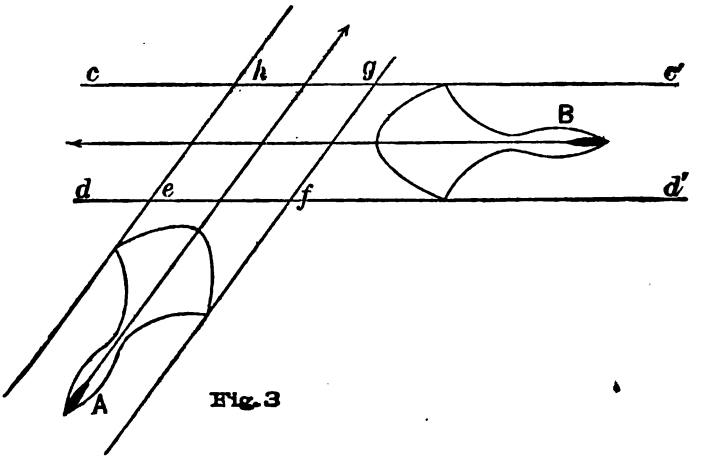

Fig. 3

If the maneuvering area was moved along the line of the vessel's course, it would be bounded by the two parallel lines, c, c', d, d', the included space being termed the "track."

When the tracks of two ships, A and B, intersect, the figure included, b, f, g, h, will represent the space in which collision will occur. Furthermore, it is the only

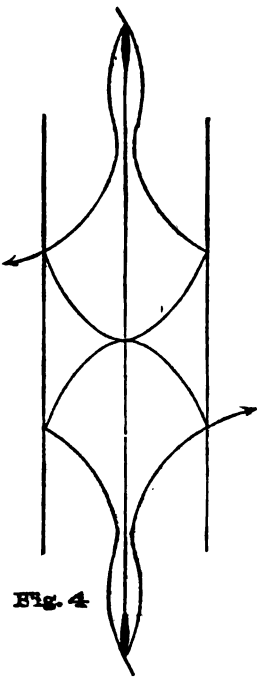

Fig. 4

space in which collision can occur, both vessels being, under these circumstances, within this area at the same time. Therefore, if the ship to maneuver does not have her maneuvering area completely overlaid by the track of the vessel to be avoided,

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she has only to steer over its free part to make a collision impossible. Should the track of one vessel entirely overlay the track of another, which can only happen when a vessel bears head on to another which is steering the same or an opposite course, or the maneuvering areas overlay, which can only happen when the vessels are very close together, then the only way to avoid the collision space is for both vessels to steer away from it—each vessel with its helm the same way.

Two vessels are meeting end on. Here we see that the tracks are one and the same, and therefore, to carry the maneuvering area of one ship as far as possible from the maneuvering area of the other, each vessel must put its helm so as to turn its track away from the track of the approaching ship. Either helm will do it. The rule is to use port helm.

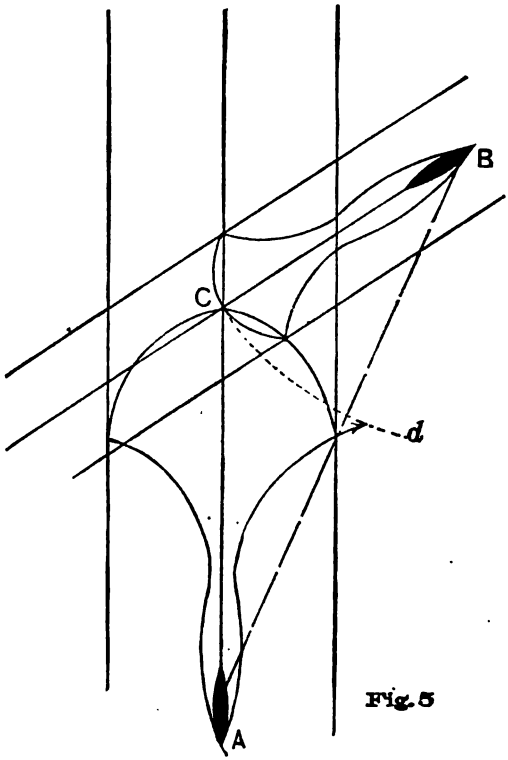

Fig. 5

Consider that A in the diagram has a speed of 12 knots and B a speed of 6 knots, and that B is at B, two points on A's bow, steering the most dangerous course, B *c*, then *c* is the point where the two vessels will collide.

Now, we see that A's maneuvering area is overlaid, except that portion which admits of the use of port helm, therefore port helm, and port-helm alone in this case, can insure, by its employment, immunity from collision.

If B was steering a course more towards *d*, her track would infringe more on A's maneuvering area. Still, port-helm for A would be indicated to let her go astern of B, slowing or reversing the engines so as to make as little advance as possible. Where port helm is used, unless the direction in which B is standing is plainly seen—and this could hardly be the case at night—stopping your way by the use of your engines is what is demanded, in order that you may cut into B's track as little as possible. The nearer the vessels are together the more reason exists for A to reduce speed.

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If a steamer was at B, bearing four points on A's bow, and was steering the most dangerous course, B, C, the use of port helm would be again indicated, unless A was

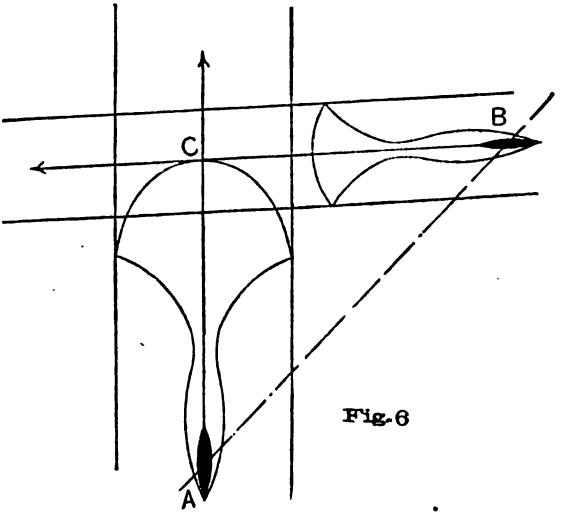
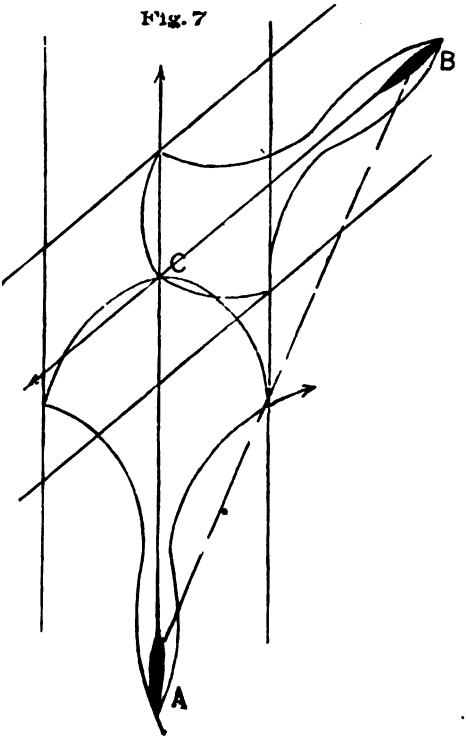


Fig. 6

entirely sure that his speed was twice that of B, in which case the danger of collision is past, since the distance A C could be more quickly traversed by A than the distance B C could be traversed by B.

Fig. 7



In this illustration A has 12 knots speed, and B 9 knots speed. We will consider B to be two points on A's starboard bow, steering the course B *c*, which will bring about a collision at *c*. The diagram shows the conditions of this relation. It will be seen that if A turns to starboard with port helm a collision will be avoided.

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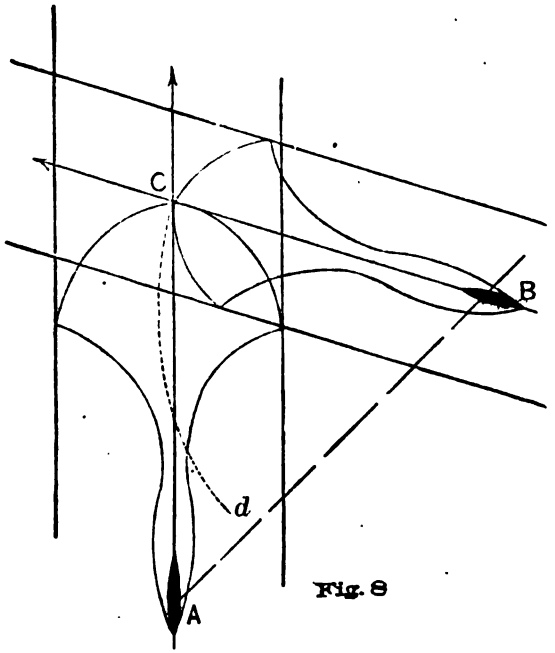

Fig. 8

In this case B bears four points on A's bow, and is steering the most dangerous course, B *c*. Collision will occur at *c*, which can, however, be avoided by the use either helm. Port helm would be preferable, from the fact that A would go astern of B by using it. However, by the employment of starboard helm, A, does not approach B's track at all, but at night we would not know whether B was standing as shown or more in a direction towards *d*, thus sweeping her track down upon A's maneuvering area; port helm would unquestionably be the safest to use, minding the speed at the same time.

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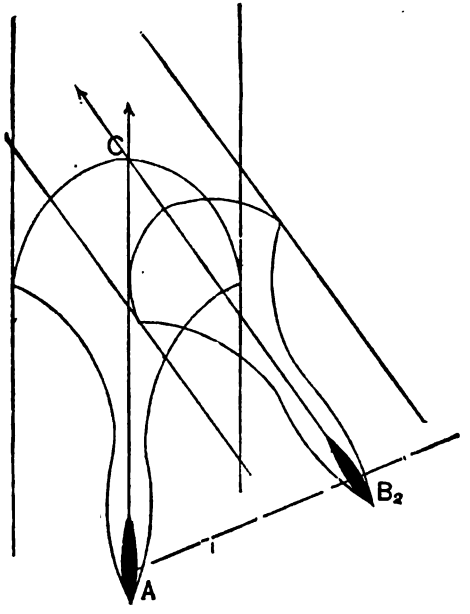
Fig. 9.



When B is so situated as to bear two points forward of A's beam, and is steering any course towards *c*, the danger of collision has ceased, since the distance, A *c*, is shorter in time than the distance B *c*, and A must pass ahead of B.

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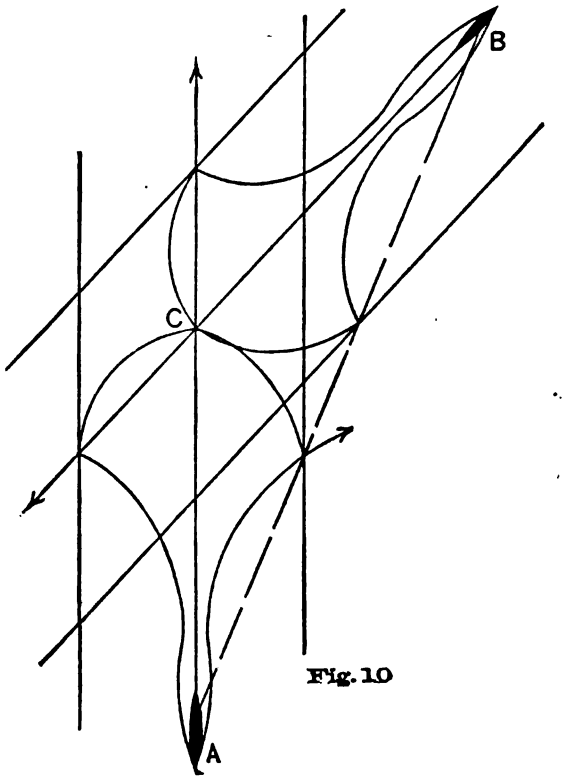

Fig. 10

In this diagram the two vessels, A and B, have each the same speed. If B is at B, two points on A's bow, and standing on the most dangerous course, B *c*, the vessels will collide at the point *c*. Now the only free portion of A's maneuvering area indicates the use of port helm on her part to avoid infringing on B's track.

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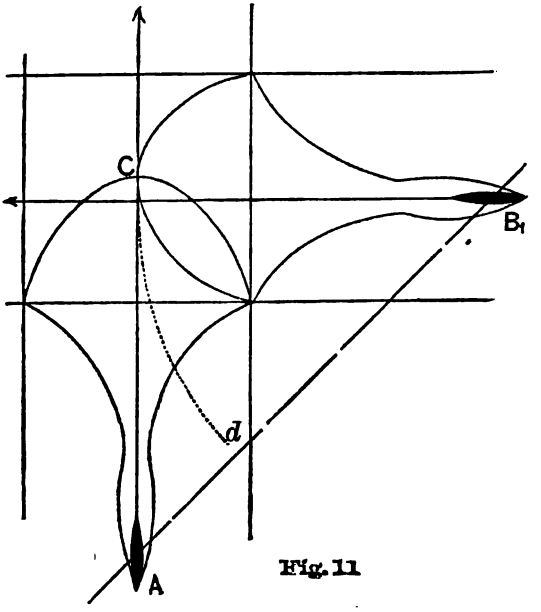

Fig. 11

If B was four points on A's bow, and was steering a course, B *c*, then the collision would take place at *c*. Here either helm can be used. Employing starboard helm and going completely around would prevent any likelihood of a collision, although the use of port helm, slowing, of course, will put A in a position of safety astern of B in the shortest time, and would be best the nearer B's track was swept towards *d*.

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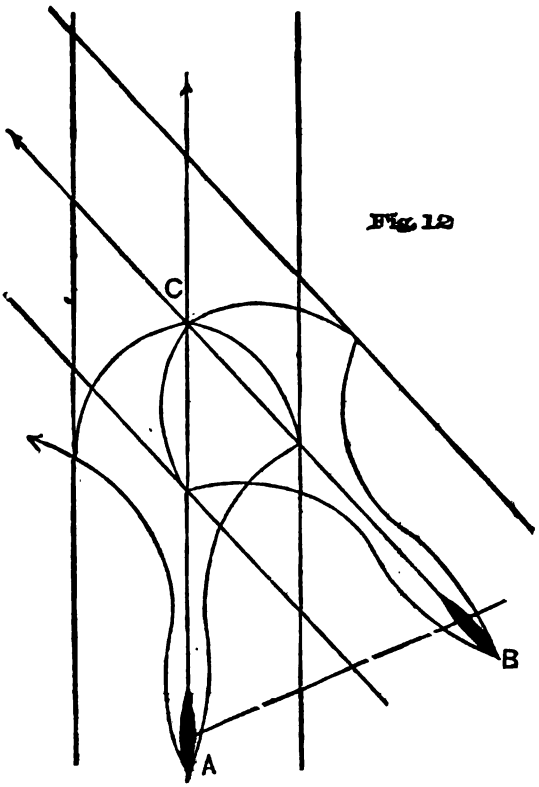

Fig. 12

Where B is two points forward of A's beam at B, and is steering the dangerous converging course B *c*, it will be seen that the collision will occur at *c*, and that the use of starboard helm, going around if necessary, will remove A fastest from the collision space.

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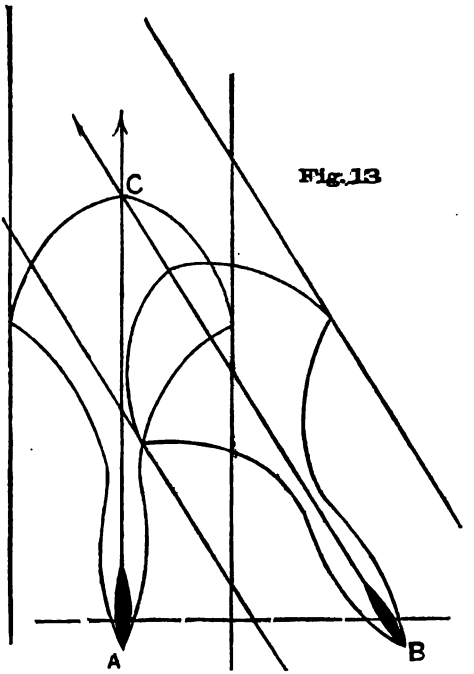

Fig. 13

When a steamer is abeam of A at B the danger of collision is past, since any course B might steer could not interfere with A's course, A c.

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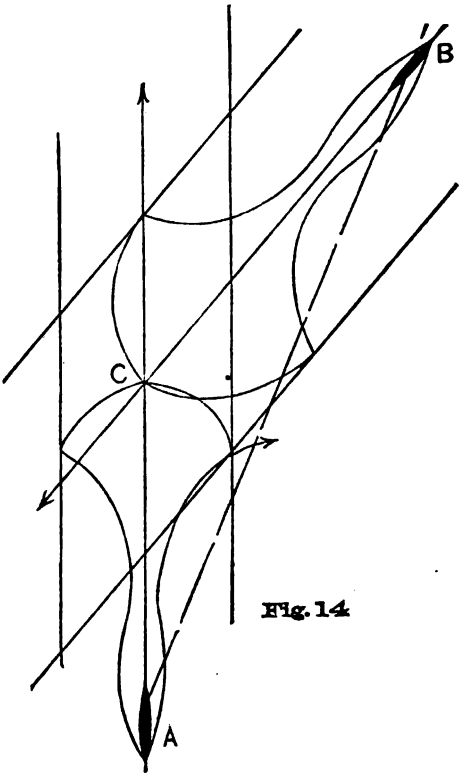

Fig. 14

We now come to look into the category where the maneuvering vessel A has less speed than the vessel which is to keep its way. We will suppose that A has a speed of 9 knots, while B has the advantage of making 3 more knots, or can steam at the rate of 12 knots on the straight.

Let us suppose that B is situated two points on A's bow, at B, and is steering the most dangerous course, B *c*. As in all other cases where this bearing is considered, the use of port helm is demanded, since the employment of starboard helm infringes more upon B's track.

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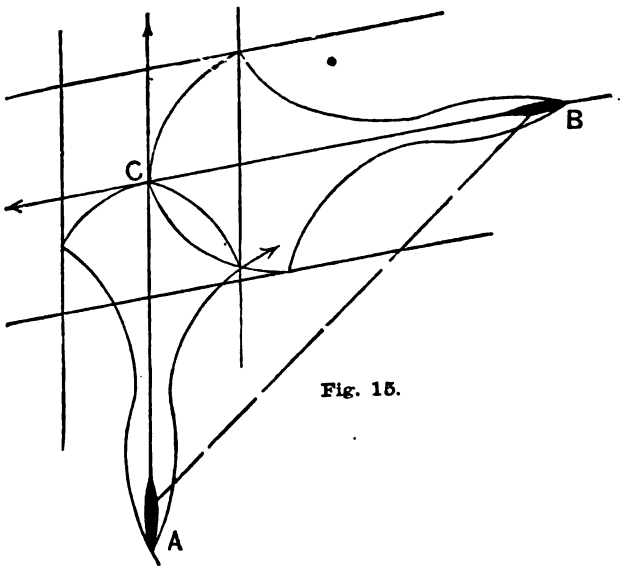

Fig. 15.

The same may be said of the use of port helm, as we see by the diagram, Fig. 15, if B was four points on A's bow, steering the course B *c*, port helm would take A safely across B's stern.

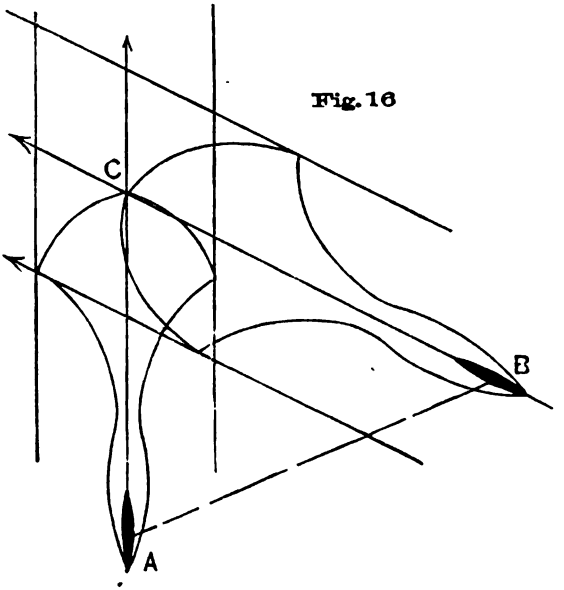

Fig. 16

A steamer is at B, two points forward of A's beam, steering the most dangerous course, B *c*. It would require the use of starboard helm on the part of A to keep out of the collision space and to avoid fouling B at *c*.

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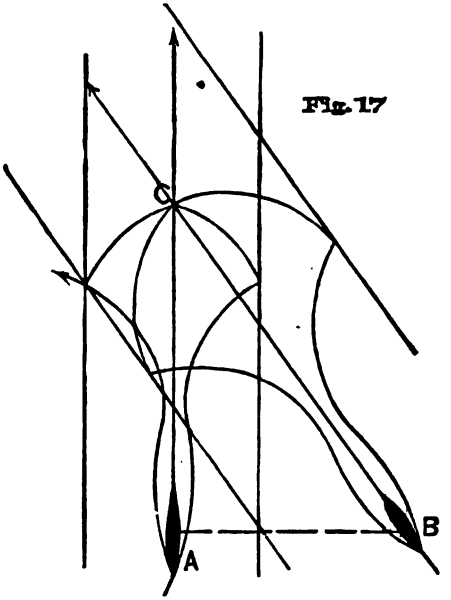

Fig. 17

If a steamer at B bore abeam of A, and was steering the most dangerous course, B c, it will be seen that A, in order to avoid a collision at the point c, would have to use the starboard helm.

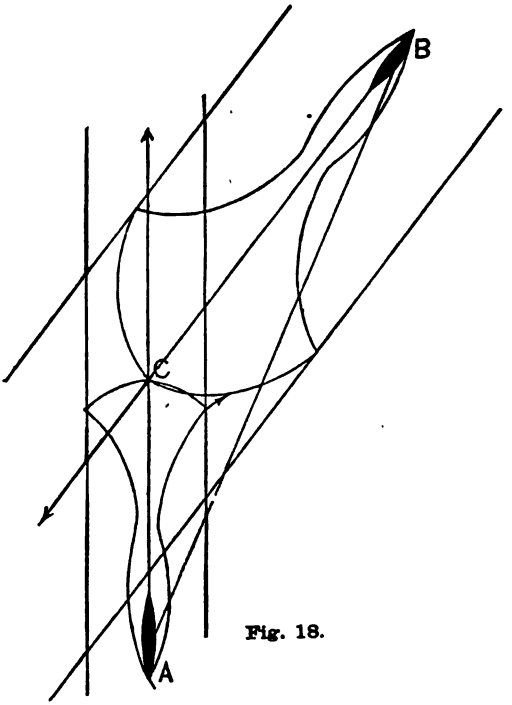

Fig. 18.

The fifth and last category is where the maneuvering ship has much less speed than the vessel to be avoided. Let us consider that A's speed on the straight is only 6 knots, while B has, under the same conditions, a speed of 12 knots.

If B bore two points on A's bow and was steering a course, B c, then the collision would take place at c. From the diagram we see that port helm must be employed by A to keep out of the collision space.

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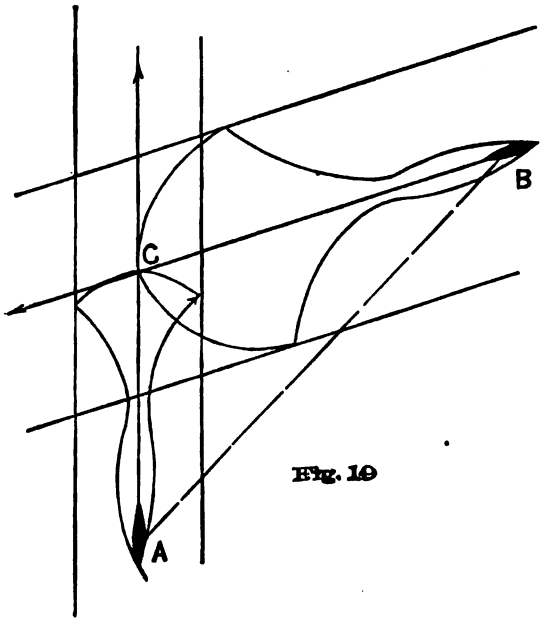

Fig. 19

Also when a steamer is at B, four points on A's bow, as is shown in the figure, where B is steering a course, B c, since the use of starboard helm makes a greater infringement on B's "track."

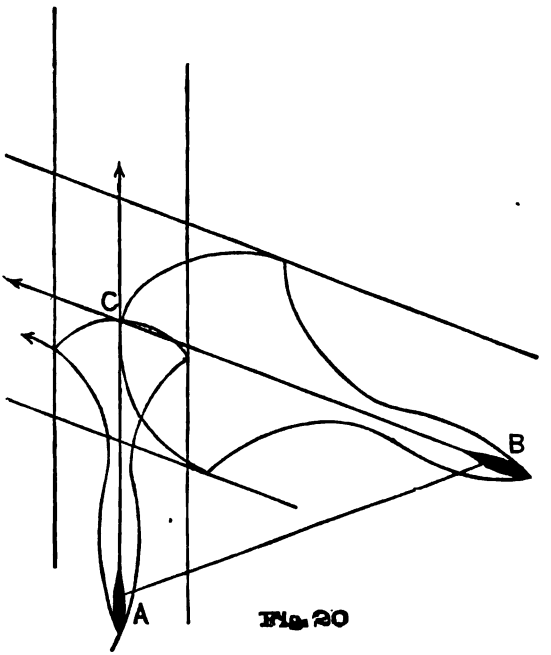

Fig. 20

By the inspection of this figure where a vessel, B, going toward c, bears two points forward of A's beam, the use of starboard helm on the part of A is seen to be necessary.

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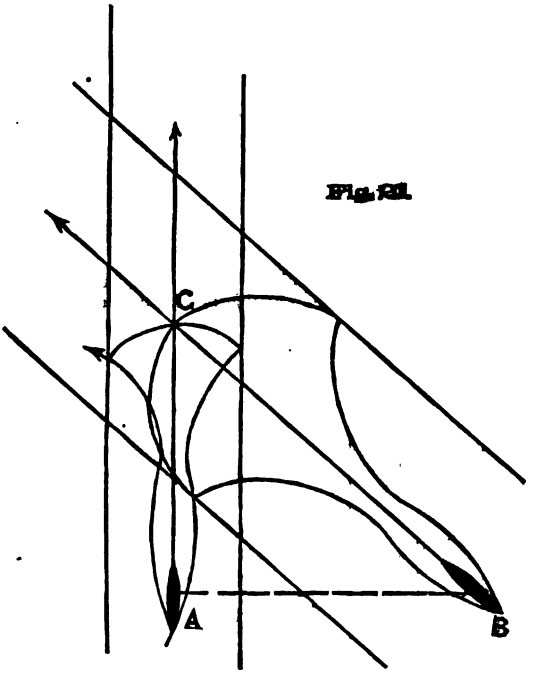

Fig. 23.

The employment of starboard helm by A is also shown in the above diagram, where a steamer, going towards c, is located abeam of A at B and steering a dangerously converging course.

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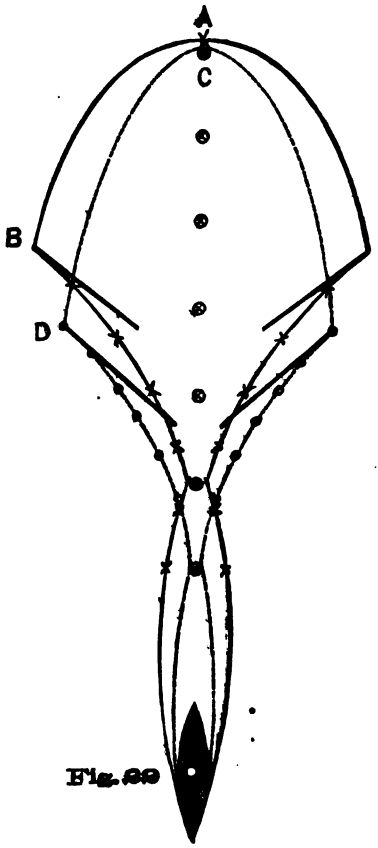

Fig. 22

In regard to avoiding collision when the vessels have, through accident, come within distances which require maneuvering on the part of each, Figure 22 enables us to examine the difference of the maneuvering areas of the same ship, one taken when going ahead at 12 knots on the straight, and the other when the vessel is backing from a speed of 12 knots on the straight. The helm angle is the same in each instance.

Here the continuous lines give the maneuvering area when going ahead; the dotted lines the maneuvering area when the vessel has its engines reversed.

The speed at A is 12 knots, while at C it has commenced to fall off, and will disappear and turn to sternboard in about fifteen seconds. At B, the vessel steaming ahead, has a speed of 9 knots, while at D the backing vessel has no speed. In each case, though, the vessel has about turned through the same number of points, and the time that the ship has taken to arrive at these two positions has been, in each instance, the same, that is, about seventy-five seconds.

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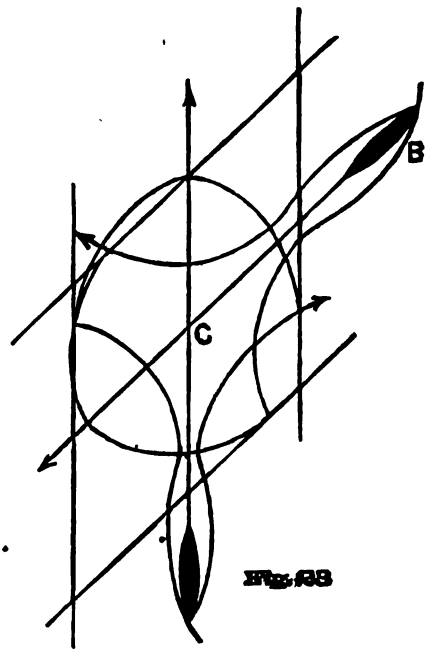

Fig. 23

When two vessels are put in a position where there is a necessity for each to maneuver (Fig. 23) B is in the octant of port helm. Nothing which one vessel can do can insure her going clear of the other, since both vessels are, in point of time, only forty-five seconds apart, and each vessel's track overlays the other's; but if B used her helm (Fig. 23) to turn from A, and A herself turned to starboard with port helm, the greatest distance would be put between them. If A should at the same time reverse her engines the distance would be still greater.

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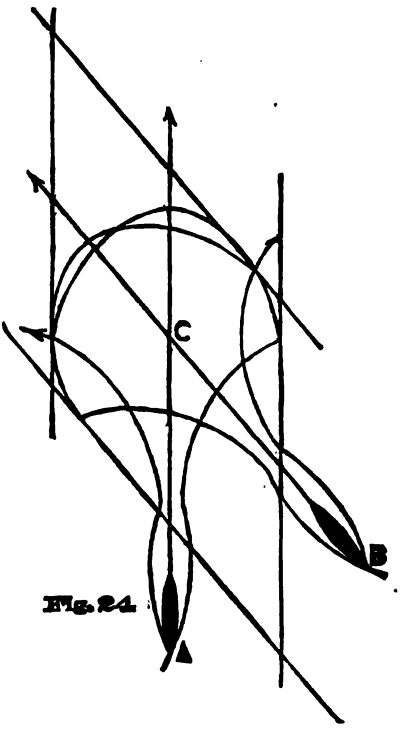

Fig. 24.

If B was in the octant of starboard helm (Fig. 24) the same rule would hold good of each ship turning from the other, A using her starboard helm and backing or else going clear around, and B using her port helm and turning to starboard.

A rule may therefore be laid down that the vessel which, under other circumstances, would keep her course, should, when the separating distance is very small, turn from the maneuvering ship. The maneuvering vessel should obey the rule laid down in the table, and at the same time reverse her engines.

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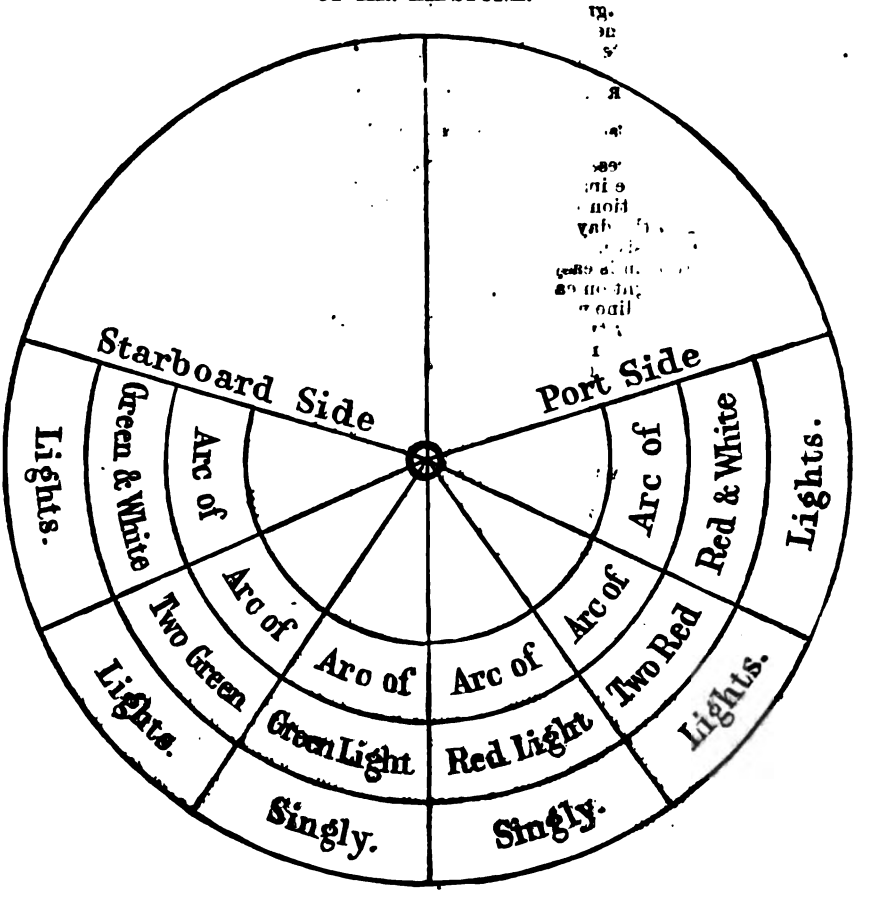
DIAGRAM

SHOWING THE COMPOUND-LIGHT SYSTEM

OF MR. LIDSTONE.



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SHIPS' LANTERNS.

SYSTEM OF SHIPS' SIDE LIGHTS PROPOSED BY MR. LIDSTONE.

Mr. A. F. Lidstone, of Calcutta, British India, has proposed an arrangement for showing more lights in the same lantern, which is similar to one suggested by Captain Littrow, of the Austrian navy, with the exception that it separates the present side-light arcs into three divisions instead of two, the side lights now used, to show singly or in connection with two "indicator lights." The plan is to make the red and green side lights show singly from right ahead to the three points on the bow; from three points on the bow to two points forward of the beam, the side lights to show in conjunction with an indicator light of the same color; and from two points forward of the beam to two points abaft the beam, the present lights to show in conjunction with a white indicator light, the two shutting off simultaneously.

A plan somewhat similar has been suggested by an American gentleman of experience residing in Philadelphia* as well as others who recommend the double-light system. The accompanying dia ram and those which follow are designed to illustrate the operation and effect of son e of the best known and most popular changes proposed for the illumination of steam and sailing vessels.

THE STRETTON SHIPS' SAFETY LIGHTS.

[Extract from Capt. W. G. Stretton's letter of explanation.]

The defectiveness of the pr ent system of ships' lights being admitted, the question arises, what shall we hav stead? I take it that we require a system that will tell us in the night the direc of a ship's head with the same certainty that the vessel's masts show this in time. I submit that such a thing is not only feasible but simple and ine

The solution of the p y enough. Have two masts lighted up for night work. One more colored lig ch side is all that is required for this. Two colored lights on each side in a with the keel, separated by a proper distance, will be to all intents and purposes our two masts lighted up, and will do for us at night what the masts do for us in the daytime, viz, show us the direction of the ship's head.

There is no denying this. A small batten of wood a foot or so long with a match or steel pen stuck in each end to represent the lights, and held upon a level with the eye and moved from left to right, and *vice versa*, will prove it at once.

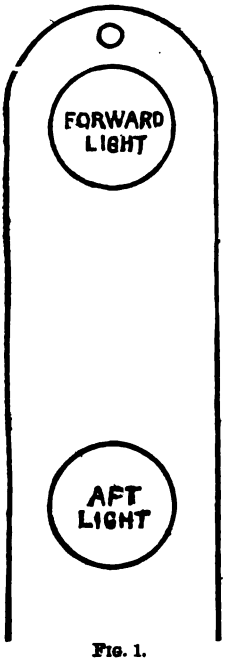

FIG. 1.

These lights, as I said before, must be in a line with the keel, the fore one a few feet higher than the after one, and placed inside a bent standard, so fashioned that the after light may shine through it as in the margined rough sketch, which gives a view of the standard, or any other contrivance, as seen from right ahead, in which the after is seen a few feet below the forward one. The forward light should show an unbroken light around eight points of the compass, viz, from right ahead to abeam, when it should be obscured. The after one should show an unbroken light over sixteen points of the compass, viz, from right ahead to right astern. They should be well raised, much higher than they are usually carried, say on the upper bridge, if there is one, or, better still, on a level with the boat's davits. They might be fitted with ladders, and connected by fore-and-aft bridges, if necessary; but these are matters of detail of secondary importance, which can be left to the builders, and which present no difficulties.

The effect of this lighting would be that a steamer's bow, end-on, would show her masthead light and two red and two green lights vertically above one another, as in the sketch No. 2. As she moved round to port or starboard, her colored lights would open in proportion to the number of points her head had "paid" off, as seen in Fig. 3.

B C represents the distance the lights are separated—say 100 feet—and is divided into eight equal parts, which represent eight points of the compass. A shows the position of the forward light and D the after one, A being 4 feet higher than

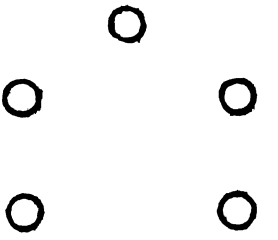

FIG. 2.

*Captain Parry.

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D. A D, therefore, shows the relative position of the two lights, or how they would appear to an observer, the steamer being broadside-on, and A 1, A 2, A 3 similarly show the appearance of the lights, or how they would open out as the steamer's head paid off one, two, or three points to starboard from her end-on position. After having

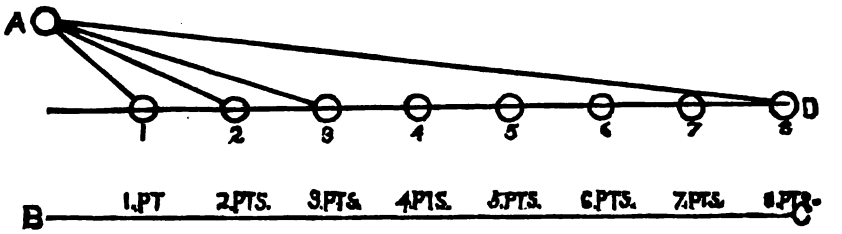


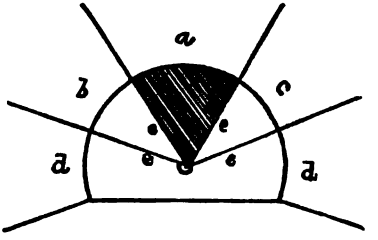
FIG. 3.

paid off eight points she would show her masthead light and one colored light, the after one. At ten points the masthead light would be obscured, as now, and the after colored light alone be visible. When stern-on she would show one red and one green light on their respective sides. There would thus never be any excuse for a steamer to run over another vessel when overhauling her, as has sometimes happened; in fact, did happen only the other day, when the British steamship Nerbudda, coming up astern of a French bark, on the Malabar coast, ran over and sunk her.

THE HOLM MASTHEAD LIGHT FOR STEAMERS.

[Extract from Capt. Jacob Holm's letter describing it.]

This light was intended to be exhibited a few feet below the present masthead light. The practical utility of the light will best be seen by examining the diagram below:



a. Shaded 6 points.
b. Red light 8 points.
c. Green light 8 points.
d. Bright light 4 points.
e. Screens.

FIG. 1.

The next diagram shows a steamer, at A, which sees the red side-light of another steamer, B, on her own starboard side. A does not know whether B is steering in the direction indicated by the lines *a*, *b*, or *c*.

If the proposed lights were hoisted on B, then if she were steering in the direction of B *c*, one bright masthead light would be seen by A. If steering in the direction of B *a*, her two bright masthead lights would be seen; and if steering in the direction B *b*, the red light under the bright masthead light would be in sight. At the same time, if B *c* ports her helm, then she will show a red light under the single bright masthead light; and if B *a* starboards her helm, then the lower bright masthead light will change color to red. In fact, an alteration of course of three points or more, and in many cases of less than three points, will always be indicated by a change of color in the light. The system proposed by Captain Stretton is, I think, likely to find many advocates; but the present system does exactly the same, and in any other position but nearly "end-on" I cannot see that, better than that, it is unable to show a vessel's course.

The difficulty with that system appears to be in not

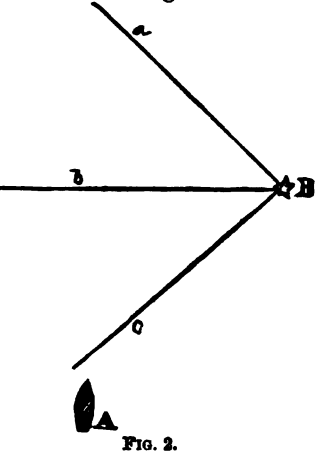


FIG. 2.

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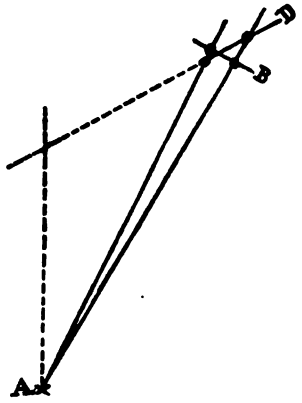
showing whether the lights seen are those of a small vessel, say 30 feet apart, or of a large vessel, with 60 feet between them; this is shown by the following diagram:

[Scale $\frac{1}{16}$ inch to 20 feet.]



A. The observer.

B. Vessel with 30 feet below lights.

D. Vessel with 60 feet distance between lights.

Stippled lines: Course lines.

FIG. 3.

Of course it should be required by law that the distance between the two side lights should be equal, whether the vessel was large or small; taking the small vessel as the standard, with say 30 feet between the lights.

Captain Stretton says that his system may challenge the criticism of the world, but the lighting up of vessels will only become perfect when we come so far that by means of electric lights, or by an improved Balmain paint, or something else, the vessel may be illuminated and seen as clearly in the night as during the day.

With the present international requirements it would not be well to go beyond the rules without putting an acceptable plan in the place of them; one thing is certain, however, that *the lights in ships' lanterns should have the power of a certain number of light units, or sperm candles.* This would give an advantage in being of so distinct a nature that it would not leave room for any misunderstanding in different countries, at the same time giving scope to manufacturers and inventors to make experiments and innovations to produce the most powerful light by means of improved glass or otherwise, in the cheapest way.

Letter addressed to the Commissioner of Navigation by Hon. Addison Brown, United States district judge for the southern district of New York.

NEW YORK, *November* 24, 1886.

DEAR SIR: I have the honor to have received recently from your Department a volume of the Navigation Laws of the United States.

By section 4 of the act of July 5, 1884, organizing the Bureau of Navigation, I observe that the Commissioner of Navigation is required to "investigate the operation of the laws relative to navigation, and annually report to the Secretary of the Treasury such particulars as may in his judgment admit of improvement or require amendment."

There has been recently before this court in the case of the Aurania a disclosure, as it seems to the court and to all engaged in the cause, of a very grave difficulty, arising out of the exception of "harbors," in section 2 of the act of March 3, 1885, concerning the revised international regulations. (See pp. 126–132 of the Navigation Laws, &c.)

I forward herewith a copy of the opinion of this court, which was published by one of the parties to the cause (without revision), and which, on pages 4–8, refers to the difficulties alluded to. All with whom I have conferred on this subject agree that the term "harbor" in the exception of section 2 is calculated to produce endless confusion and fatal consequences. A little consideration of the matter will, I think, satisfy you that the word "harbors" should either be stricken out of section 2 or else should be preceded by the word "inland." All agree that it is utterly impracticable to apply two conflicting sets of rules of navigation to a single ocean voyage, terminating in a harbor situated upon, or within, our *coast waters*, that is, not strictly an *inland* harbor, such as on the lakes or up the rivers, away from the sea-board. No

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other maritime nation adopting the revised regulations has made such an exception as our own act makes in reference to "*harbors*," though their situation as to coast harbors is identical with ours. That it is extremely undesirable that a different set of rules of navigation should be in force, even as respects lakes and inland waters, from those applicable to the high seas, seems to me plain, since there are more or less of voyages which are performed partly upon one and partly upon the other, though these are vastly less in number than ocean voyages, terminating at coast water harbors.

Presuming that Congress, in making the exception in section 2, were reluctant to extend the revised regulations to lakes and inland waters, I do not recommend anything to be done now on that branch of the subject, since it might lead to delay. But the difficulties arising from the use of the word "harbors" as applying to all harbors indiscriminately are so great that instant remedy should be afforded so far as to cover all ordinary ocean voyages terminating at harbors upon the coast waters.

I beg to submit this matter, therefore, respectfully to your consideration, and hope that it may appear to you of such pressing importance as to justify a recommendation that the word "harbors" be stricken out of section 2 of the act of March 3, 1885. The words "lakes or inland waters," immediately following, probably cover all that Congress really intended to except, and to hold subject to the former regulations. Those words necessarily cover all harbors upon the lakes or inland waters.

Respectfully yours,

ADDISON BROWN,
United States District Judge.

JARVIS PATTEN, Esq.,
Commissioner of Navigation.

NOVEMBER 25, 1886.

Hon. ADDISON BROWN,
Judge United States District Court, Southern District, New York:

SIR: I have the honor to acknowledge the receipt of your present favor of November 24, with the accompanying pamphlet, which I have read with much interest, containing the decision in the case of a collision between the steamers Aurania and Republic while navigating coast waters of the United States.

I had previously observed the doubtful phraseology of the section to which you refer, and have called attention to it in my annual report now in the hands of the printer, and I am not surprised that a case in point has already arisen.

If there is no objection, I would like to publish the letter containing your criticism of the law, which I can do in the appendix to my report, as it would make the urgency for immediate action more apparent.

It appears to me that by adding the words "and harbors made use of by sea-going vessels" after the words "coast waters" in the enacting clause, and by dropping the word "harbors" from the exceptions enumerated in section 2, the confusion liable to occur by use of different rules would be avoided. As you remark, it was evidently the design of Congress to exclude from the domain of the revised international regulations only inland harbors, the others being embraced in the general term coast waters.

JARVIS PATTEN,
Commissioner.

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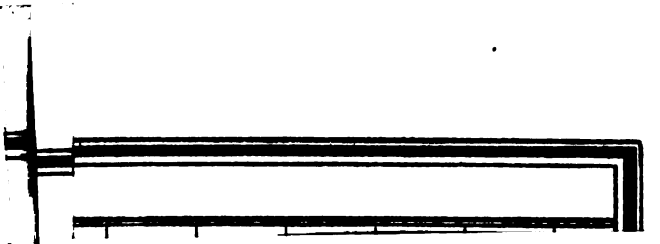

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